World Petroleum

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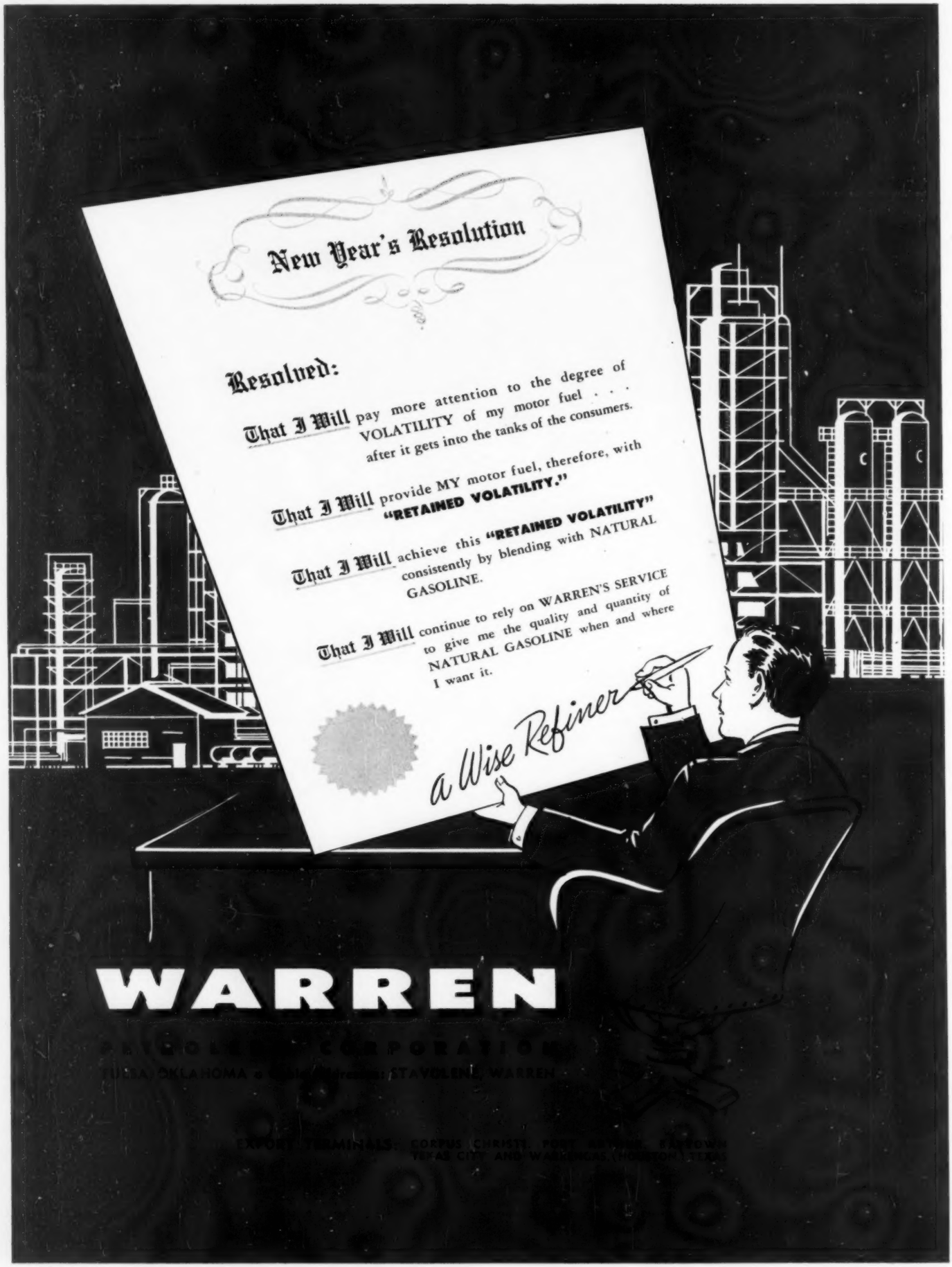
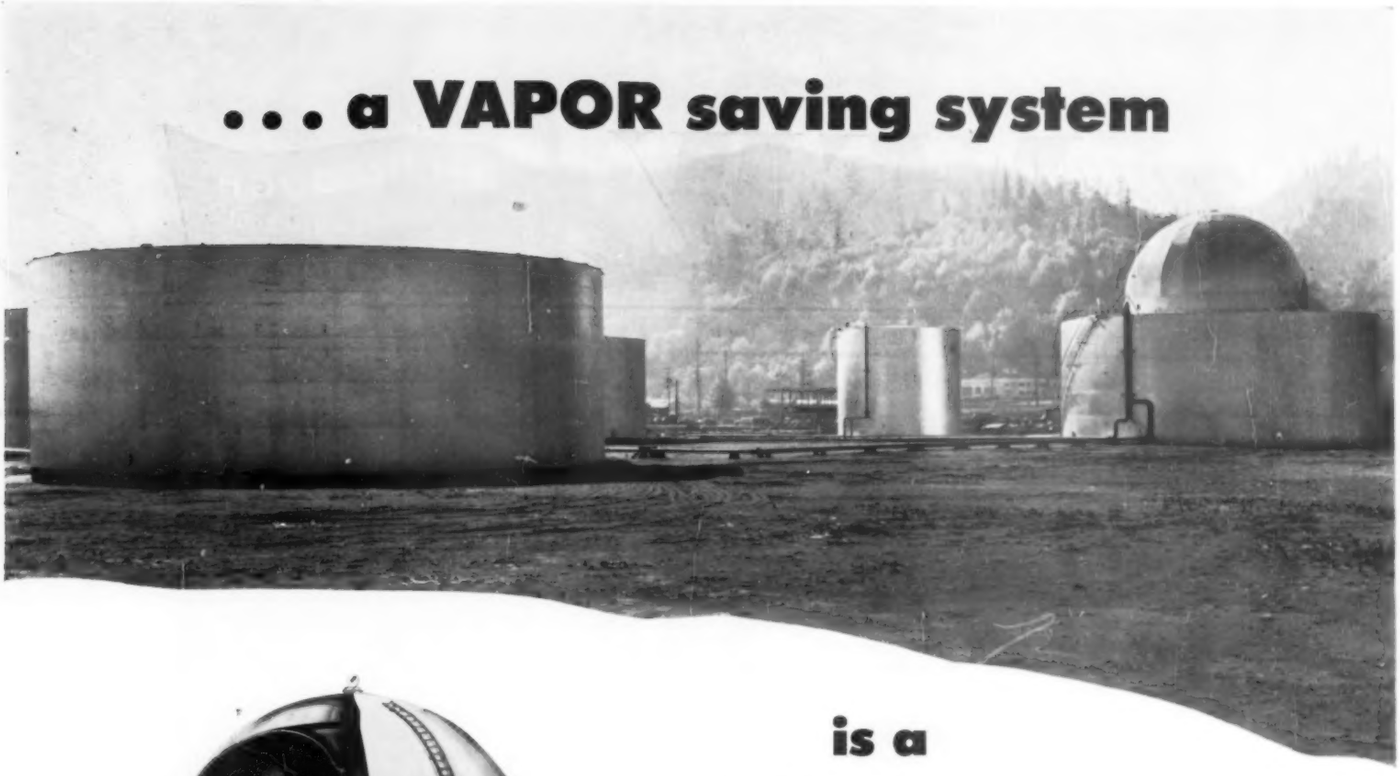
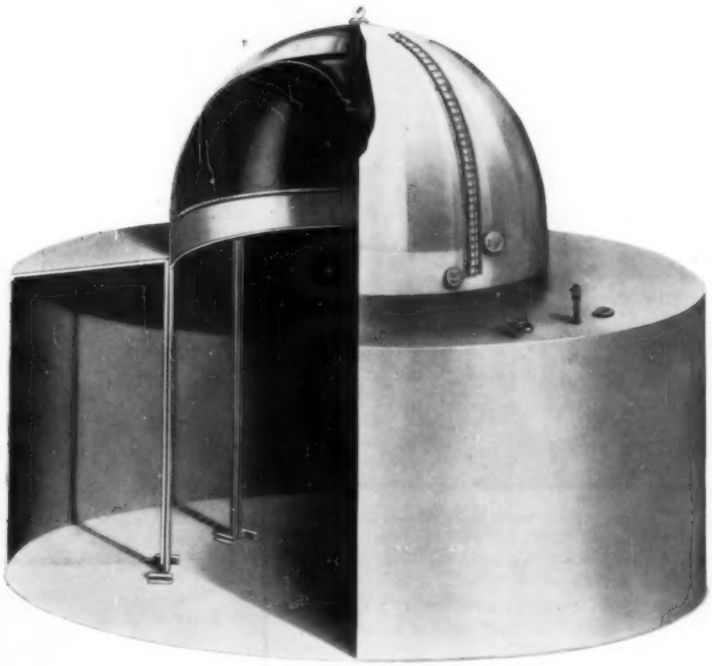
JANUARY 1954


New Year's Resolution
Resolved:
That I Will pay more attention to the degree of VOLATILITY of my motor fuel . . . after it gets into the tanks of the consumers.
That I Will provide MY motor fuel, therefore, with "RETAINED VOLATILITY."
That I Will achieve this "RETAINED VOLATILITY" consistently by blending with NATURAL GASOLINE.
That I Will continue to rely on WARREN'S SERVICE to give me the quality and quantity of NATURAL GASOLINE when and where I want it.
a Wise Refiner
WARREN

. . . a VAPOR saving system



is a DOLLAR saving system



Cutaway View of a Flat-Bottom Tank Equipped with a Hortondome Roof

The tank bottom, shell, top angle and edge of the roof are the same as a flat-bottom tank with a cone roof. The Hortondome is of welded construction. It is located in the center of the roof and supported on equally spaced columns. The flexible membrane is made of CHI-LON®, a fabric coated on both sides with petroleum-resistant synthetic rubber.

Evaporation losses from flat-bottom storage tanks and the subsequent loss of dollars can be prevented. One cure is a vapor saving system . . . with a tank equipped with a Hortondome* Roof.

A tank with a Hortondome Roof may be operated as an individual unit or it may be connected, by vapor lines, to the vapor spaces of one or more adjacent tanks with fixed roofs. This allows the air-vapor mixture in a group of storage tanks to expand and contract without the usual attendant evaporation loss. Protection of moving parts in the Hortondome Roof and simplicity of vents, gages and other tank fittings insures continuous and dependable operation at all times.

Operation of a Hortondome Roof is simple. A flexible hemispherical membrane is attached, by its outer edge, to the equator of the Hortondome. As thermal expansion takes place or filling occurs, the membrane rises to make room for the displaced vapor. When conditions causing the increased vapor volume are reversed, the vapor returns to the tanks allowing the flexible membrane to descend.

Further information, estimates or quotations on the Hortondome Roof, or any other Horton structure, may be obtained by writing our nearest office.

**Trade Mark*

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What's NEW

In Perforating, Logging, and Fishing Tool Services

Latest News About New Tools, Techniques and Services

"You can log a well one or ten times—with the McCULLOUGH Radiation Well Logger—You'll get the same consistent, accurate answer."

HERE'S WHY —the Scintillometer, the heart of the McCullough Well Logger, approaches 100% efficiency in measuring gamma radiations. There is little chance that a gamma ray will pass through the Scintillometer without causing a measurable scintillation.

This is important because the radiation to be measured is not constant. No element gives off a set number of gamma rays per time unit. These radiations will vary during the time interval immediately preceding or immediately following. A counter must have the ability to measure a representative number of radiations to provide a reliable log.

The Scintillometer, exclusive in the McCullough Radiation Well Logger, measures almost 100% of all gamma radiations whether the level of radioactivity be high or low. Since it always measures a representative number of radiations, duplicate logs in the same well give the same answer—sharp, clear logs with definite breaks and markers.

Because of its extreme efficiency, the Scintillometer need only be a few inches in length to assure representative measurement—more than ten times less the length of other type counters. This is advantageous in measuring thin beds.

A very important characteristic of the Scintillometer, is that it measures only gamma radiation. Therefore, the instrument is calibrated at absolute zero and makes recordings in absolute units—micro-roentgens. Another assurance of consistent, reliable logging information.

Then too, the Scintillometer is insensitive to temperature change. Excellent duplication of any portion of a well is obtained without the interference of temperature drift.

For consistent, reliable, accurate and stable logs—every time—specify the McCullough Radiation Well Logger with the amazing Scintillometer.

McCULLOUGH RADIATION WELL LOGGER

with SCINTILLOMETER

(GAMMA RAY AND NEUTRON LOGS)

1. Efficiency approaches 100%.
2. Very short length counter.
3. More detail in log.
4. Faster logging speeds possible.
5. Calibrated in absolute International Units established by United States Bureau of Standards.
6. Extremely stable equipment.
7. Log accurately repeats itself—running in and out of hole.
8. All controls at the surface.
9. Log detail can be varied.
10. No base line drift; no sensitivity drift.
11. Records all or selected band of entire range of gamma radiations.
12. Simultaneous recording of collar log.
13. Retouching or tracing log not necessary.

THE McCULLOUGH RADIATION WELL LOGGER WITH SCINTILLOMETER (GAMMA RAY AND NEUTRON LOGS) IS AVAILABLE IN MOST ACTIVE OIL FIELDS—CALL YOUR McCULLOUGH SERVICE ENGINEER FOR COMPLETE INFORMATION.

PERFORATING, RADIATION LOGGING, AND FISHING TOOL SERVICE—ANYWHERE—ANYTIME.

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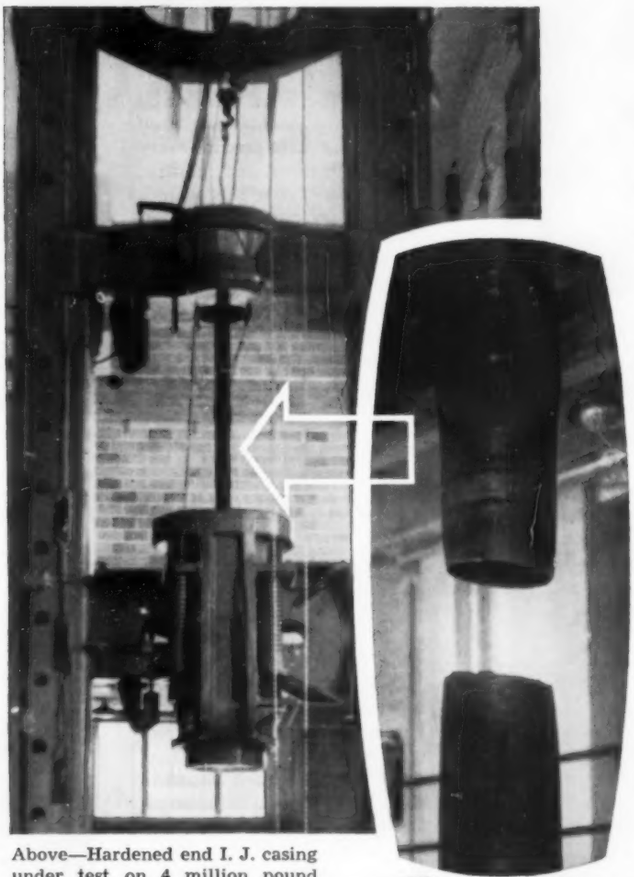
SERVICE LOCATIONS: TEXAS: Houston, Snyder, Alice, Cisco, Corpus Christi, McAllen, Odessa, Tyler, San Angelo, Victoria, Wichita Falls, Luling, Beaumont, Sherman, Midkiff, El Campo. **OKLAHOMA:** Oklahoma City, Guymon, Healdton, Hominy, Wewoka. **ARKANSAS:** Magnolia. **MISSISSIPPI:** Laurel. **NEW MEXICO:** Hobbs. **KANSAS:** Great Bend. **WYOMING:** Casper, Cody, Newcastle. **CALIFORNIA:** Los Angeles, Avenal, Bakersfield, Ventura. **LOUISIANA:** Houma, Lake Charles, New Iberia, Shreveport. **COLORADO:** Sterling. **NORTH DAKOTA:** Williston. **UTAH:** Vernal.

WORLD PETROLEUM for January, 1954. Vol. 25, No. 1, January, 1954. WORLD PETROLEUM is published monthly by Mona Palmer, Trustee under the will of Russell Palmer, 604 Fifth Ave., New York 20, N. Y. Acceptance at East Stroudsburg, Pa., under Section 34.64 P. L. & R. Authorized. Subscription rate: $5.00 per year, single copies $1.00. Copyright 1954, by Mona Palmer, Trustee.

EXTRAS *that make it* BETTER



Above—Hardened end I. J. casing under test on 4 million pound testing machine at University of California. Closeup at right—Note that tested pipe broke in body, away from threaded connection.

Hardened Ends and API Threads on Youngstown Deep Well Casing

YOUNGSTOWN casing - Integral Joint and Threaded and Coupled - is produced with heat treated ends to meet the higher requirements of deep well drilling. The advantages are:

1. Controlled heat treating of ends assures homogenity of structure throughout the pipe wall.
2. Hardening makes upsets unnecessary, thus eliminates obstructions on the internal surface of the casing.
3. High joint strengths - meeting requirements of API Bulletin 5A-1 - are proven by repeated tests.
4. Integral joints improve long strings by eliminating half the threaded joints. Simplification also results as the same thread can be used for an entire string, heat treated on top, untreated on bottom. No crossover joints required.

For data on actual performance in the field, write or phone the nearest Youngstown District Sales Office.

QUALITY V YOUNGSTOWN SERVICE

Youngstown

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How THE NATION'S LEADING PIPELINES USE PHILCO *MICROWAVE*

Philco Microwave is being used daily by the Nation's leading pipeline companies. These pipeline companies have selected microwave because: (1) it is an economical, reliable and expandable communications system eliminating costly and vulnerable wire lines, and (2) it provides them with private, dependable communications over long distances, cutting maintenance costs to a minimum.

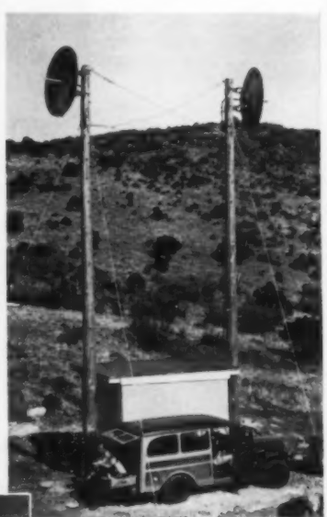
Pipelines stretching over hundreds of miles can be operated and controlled from a single point by microwave. Pressure, rate of flow and tank level readings can be recorded automatically and relayed to headquarters or various points along the route. Philco Microwave carries telephone, teletype, control and telemetering channels . . . *and offers complete tie-in with VHF two-way radio systems and existing wire line facilities.*

Shown here are two of the many Philco Microwave systems that provide the nation's leading pipelines with modern and efficient communications.

From this central console headquarters at Kansas City, Missouri the entire Platte pipeline and communication system can be controlled and monitored.

Platte Pipe Line Company's microwave system is over 1000 miles long . . . to provide every communication and control facility: voice channels, remote supervisory control, continuous or selective telemetering, teletype, alarm signaling and VHF radio. This entire microwave system was surveyed, designed and installed by Philco.

TYPICAL PHILCO PIPELINE INSTALLATIONS



El Paso Natural Gas Company has 500 miles of Philco Microwave with an average distance of 50 miles between stations. This New Mexico to Arizona system consists of repeater and terminal stations, multiplexing equipment for system party line and VHF radio channels.

The longest microwave hop in the nation is this 81-mile El Paso hop from Mount Elden to Dilkon, Arizona . . . typical of the utilization of terrain advantage by Philco.

OTHER INDUSTRIES USING PHILCO MICROWAVE

Communication companies use Philco Microwave for telephone, telegraph and television transmission. Reliability, economy and quality of transmission make Philco Microwave ideal for their use.

Philco Microwave is being used by leading railroads for telephone, telegraph and train dispatching. Microwave is a private system, saves costly wire installations and simplifies right-of-way problems.

Utilities rely on Philco Microwave for the control of power stations, dispatching of repair trucks and communication. Dependable channels, unaffected by adverse weather, are a necessity for utility use.

For complete details, write to Dept. WR today!

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WHY PHILCO MICROWAVE is IDEAL for PIPELINES

• RELIABILITY

Philco leads the industry in the supply of microwave equipment. It is the choice of industry and the Armed Forces . . . and for good reason. Joint Army-Navyspecified components are used wherever applicable. Philco "Power House" klystrons have remained in operation for more than 20,000 hours in many installations. Highest quality components plus dependable design assure long, trouble-free operation.

• ECONOMY

Philco Microwave is designed to operate at lowest cost. Shelter-mounted antennas and tower reflectors eliminate costly, power-consuming feed lines. Philco equipment design provides the highest power output, insuring reliable, low cost communication over the longest hops.

• FLEXIBILITY

Philco Microwave design permits future expansion of facilities by the simple addition of pre-packaged, pretuned subassemblies. Each of the 24 voice channels in Philco multiplexing equipment is capable of being subdivided into 16 additional channels for telemetering, teletype, supervisory control and other uses. Convenient tie-in to existing wire or VHF facilities greatly increases utility.

• ACCURATE SURVEYS

The first step to reliable, economical microwave communications is an accurate right-of-way survey. Philco Survey Engineers have broad experience in microwave surveys and will plan your microwave system for your present and future needs at the lowest possible cost.

• SYSTEMS PLANNING SERVICE

Philco has an experienced systems planning group for consultation and assistance to aid in tailoring a microwave system to meet your specific needs. These engineers will recommend dependable, low cost microwave systems that incorporate flexibility for future expansion. This service covers entire systems including associated equipment such as control consoles, telemetering, teletypewriters, telephones, VHF radios, and other types of equipment.

• INSTALLATION, MAINTENANCE AND TRAINING

Philco can install or supervise the installation of your entire microwave system and maintain your system during initial operation. Philco can also train your personnel as they have trained thousands of technicians and maintenance men in the operation of its equipment. Only Philco can give you an operating microwave system complete with every necessary equipment and service. Write today for full information.

Washington PIPE LINE

By Joseph Huttlinger

DEPLETION ALLOWANCE AND OIL PRICES —President Eisenhower sends his first recommendations on taxes to Congress during January, amid new emphasis from top oil men of the meaning and importance to oil and gas producers of the depletion allowance of 27.5 percent.

Without the allowance, according to Serge Jurenev, vice-president of the Continental Oil Co., Houston, the cost of crude oil would be about 50 cents a barrel higher than the present price of about $2.90. The bulk of the increase would be passed on in gasoline prices, raising them about two cents a gallon.

Without the depletion allowance, or the higher price, he feels oil exploration would fall off, supply would drop, shortages crop up and reliance upon imports would grow.

Roland V. Rodman of Anderson-Pritchard Oil Co., Oklahoma City, while refusing to estimate the rise in oil product prices if the allowance were removed, said that ending the allowance would halt the industry's progress in lowering prices and its "dynamic" growth.

While no indication has come from the administration of a purpose to interfere with the long-standing depletion allowance, the fact that Treasury officials in past years have advocated its downward revision suggests a possibility that it may be considered in view of the difficulty in finding new sources of tax revenue.

Heretofore, Congress has consistently refused to tamper with the existing law.

The oil men gave their opinions as 1,500 executives of business concerns, professors and government officials sat together in Washington early in December for a talk about natural resources and ways to make sure that they are ample for the decades ahead. No concrete conclusions were announced. The Ford Foundation is financier of the meeting, the Mid Century Conference on Resources.

FEDERAL REGULATION OF IMPORTS OPPOSED —Oil imports in reasonable volume are needed, the oil men said, but they objected, in general, to locking up United States crude oil to a deliberate and large degree to save it for future needs while using imported oil.

Both importing companies and American producers objected to a federal authority to regulate imports of petroleum. Austin Cadle, economist with Standard Oil Co. (Calif.), was among the oil men asking that more states, chiefly California, set up effective crude oil proration systems.

Largely a talk session, the conference served chiefly to smoke out some ideas of critics of the oil and gas industry, and to give a chance for industry experts to furnish the answers. While there appears little immediate threat of legislation for end-use controls, for saving domestic oil in favor of larger imports, or laws setting octane ceilings, the talks did point to areas where the petroleum industry's public relations might go to work from now on.

CAPITAL SPENDING BY INDUSTRY CONTINUES —Capital spending by the American petroleum industry is continuing high.

A total outlay of $689 million is estimated for new and improved plant in the first quarter of 1954, compared with $552 million in the first quarter a year earlier.

The sum is for petroleum and coal products industries, but by far the largest part is for petroleum industry expansion, says the Commerce Department, which prepared the figures.

The continuing higher outlay compares with an overall capital spending by all manufacturing of about the same as a year earlier.

HIGH OCTANES HELD NO CAUSE OF WASTE —The gasoline octane race, chiefly in the United States, came in for criticism from non-oil men who claimed that it is a form of waste because of the added energy needed to turn out ever-better gasoline.

Not so, said E. D. Reeves, executive vice-president of Standard Oil Co. (N. J.). The loss of energy in raising the octane rating is more than made up in better performance from the new gasoline. As a result, two gallons of today's gasoline do the work which took three gallons a decade or two ago.

The idea of saving oil and gas for "high-grade" uses and to eliminate their consumption as fuel for home heating came from some at the conference, chiefly coal interests. "It's awful to use these as boiler fuel," said Alfred R. Powell of the Koppers Co., Pittsburgh. Mr. Reeves thought it "foolish" to lock up the best and cheapest fuels now in order to use a more expensive one. Mr. Jurenev thought the function of price, free markets and consumer preference should govern. A natural gas man said burning gas under factory boilers in producing areas is wisdom, for otherwise it might be wasted and flared in turning out oil.

PERSONAL NOTE ON AN OFFICIAL FAMILY —A fifth grandchild is on its way for Assistant Secretary of the Interior and Mrs. Felix E. Wormser. When it appears in mid-1954, it may be the most famous infant in the world.

The mother is Diane Wormser Schaffer of Rye, N. Y., who is 26 and strikingly beautiful. The beauty is evident in the month-by-month pictures of her being carried in issues of the *Women's Home Companion*, along with progress reports on her road to motherhood.

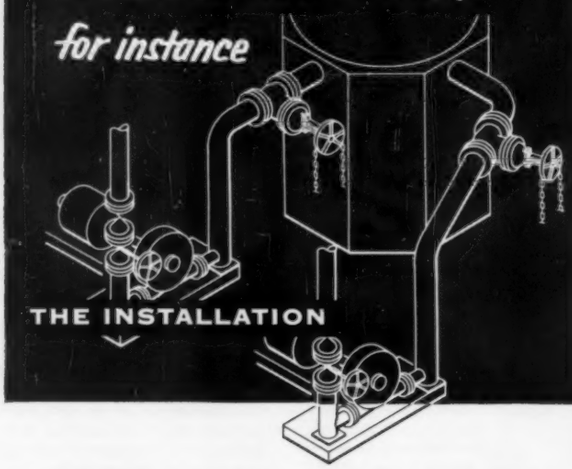
Beyond that, Mrs. Schaffer is appearing on a radio program each Wednesday entitled "The Second Mrs. Burton." There she tells more about the coming event.

An older sister, Renee, has four children, and Diane wants to catch up. "What we want now is a houseful of kids," she says.

Grandpa Wormser, who is the government's top official on oil and gas, is pleased as punch with the newcomer, but modestly shy about it. He never breathed a word when this reporter spent an hour talking business with him. It was the secretaries who let us in on it.

You're Sure of Tighter Seating with Crane Steel Gates

...in a Butadiene Plant, for instance



THE INSTALLATION

At a Southwestern butadiene plant, using Crane 18-inch steel gate valves on suction lines from extractive distillation towers to pumps. Working pressure, 90 psi, 250 to 300 deg. F.

VALVE SERVICE RATINGS

SUITABILITY:
Have what the job takes

FEATURES:
Epelloy seating

MAINTENANCE COST:
Zero

SERVICE LIFE:
Installed 1951-long life ahead

OPERATING RESULT:
Valve efficiency restored

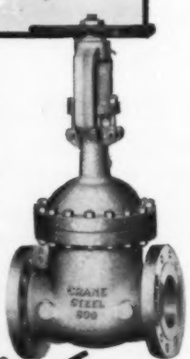
AVAILABILITY:
Catalog item—No. 33X

THE CASE HISTORY

Original valves in this service were lubricated plug valves, but they couldn't be made to seat tightly on the light hydro-carbons and furfural mixture. Their continual leakage burdened the plant with excessive maintenance, and a constant threat to process control. All these lubricated plug valves were replaced with Crane 33X steel wedge gate valves.

Installed more than 2 years ago, the Crane valves completely remedied the leakage trouble, and to date, none have required any maintenance whatsoever. They keep working perfectly with but prescribed routine care.

THE VALVE



Product of pioneer skill in steel casting, and with a long record of service to petroleum and petrochemical industries, Crane steel valves stand apart from the ordinary. Yet they actually cost less for service delivered. Choose from the widest range of body and trim materials; in all pressure classes, sizes; flanged, screwed, or welding ends. See your Crane Catalog.

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More benefits to you when you contract with GSI: *GSI Field Service also recommends correct equipment to survey your prospect; provides trouble-shooting service to GSI field parties anywhere; engineers methods and equipment to overcome unusual field problems. Write for booklet, "GSI Instrument Field Tests". It outlines GSI field party procedure in regular instrument checks. It shows another way GSI helps you in FINDING A WORLD OF OIL.*

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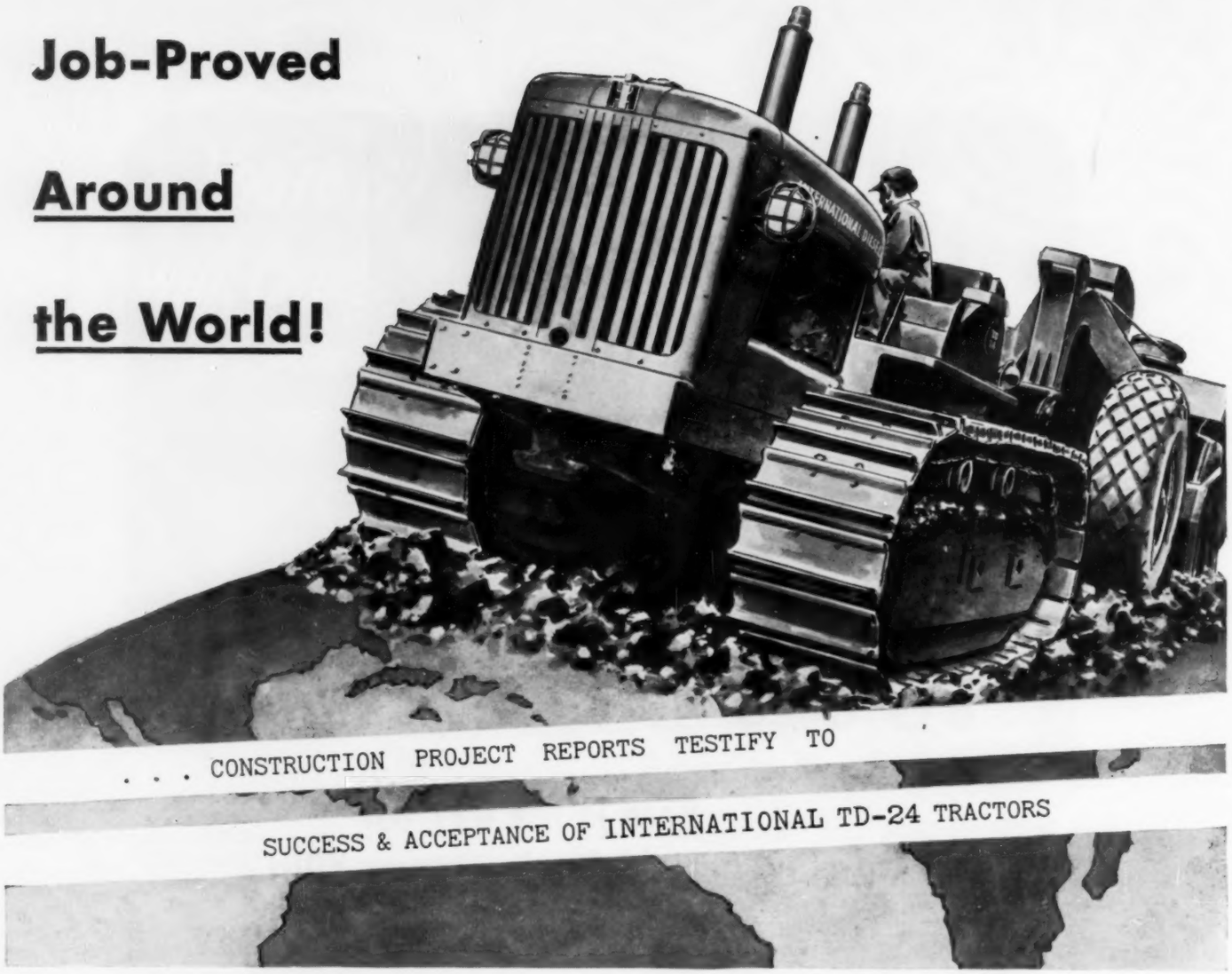

Tractors chosen to power the world's huge construction and earthmoving jobs don't get there by accident. Proved performance, and documented ability to deliver heavy-slugging power put them there.

And that's the kind of work an International TD-24 turns out under the most grueling conditions. From the frigid arctic to humid jungle regions, the TD-24 has won absolute acceptance by hundreds of governments and contractors. Over 6000 are at work around the world . . . deep-plowing in India, on Australian hydro-electric work, building roads in mountains of Venezuela, laying big-inch pipe in the Middle East. *No other tractor matches this agile, powerful giant!*

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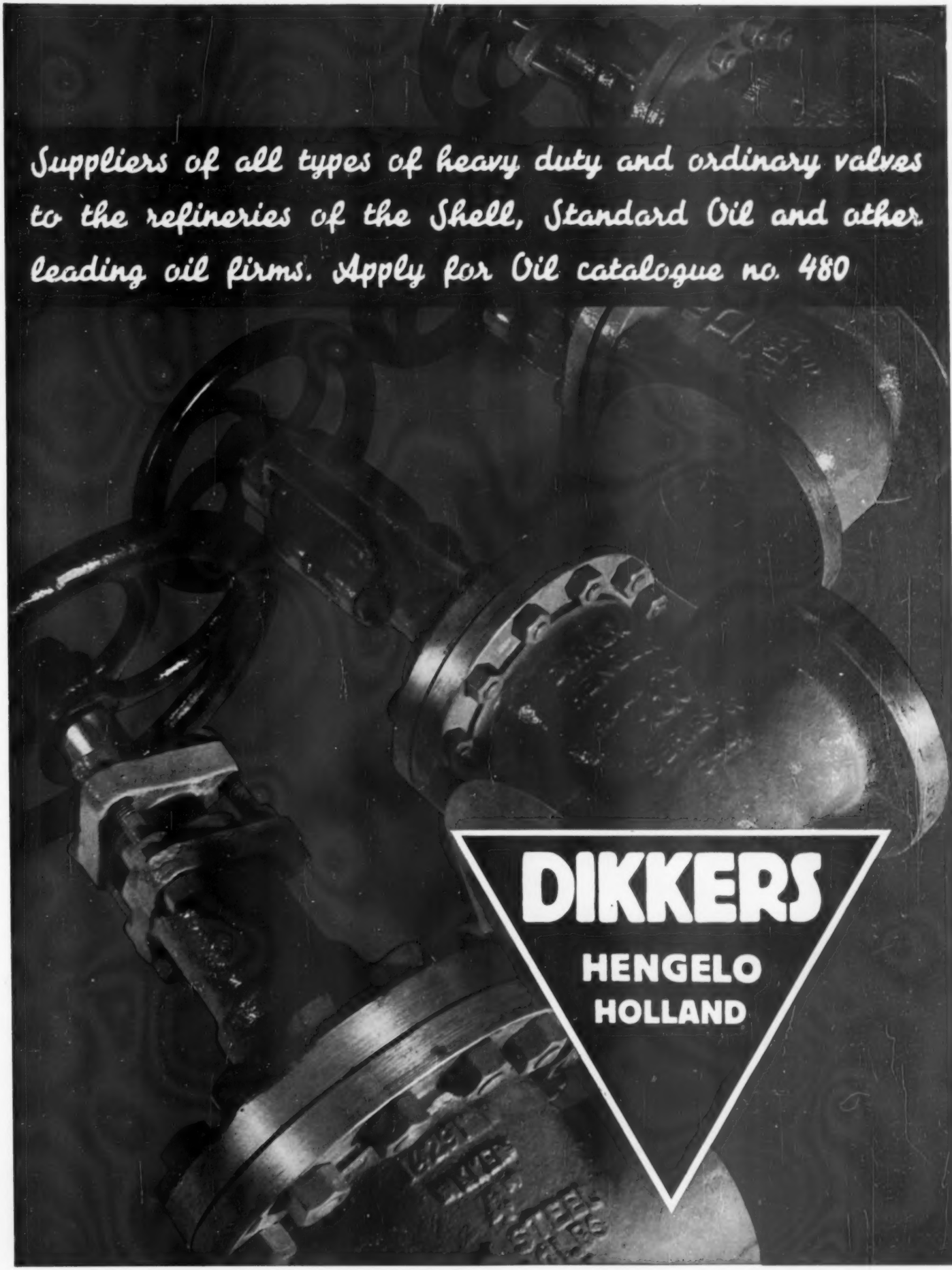
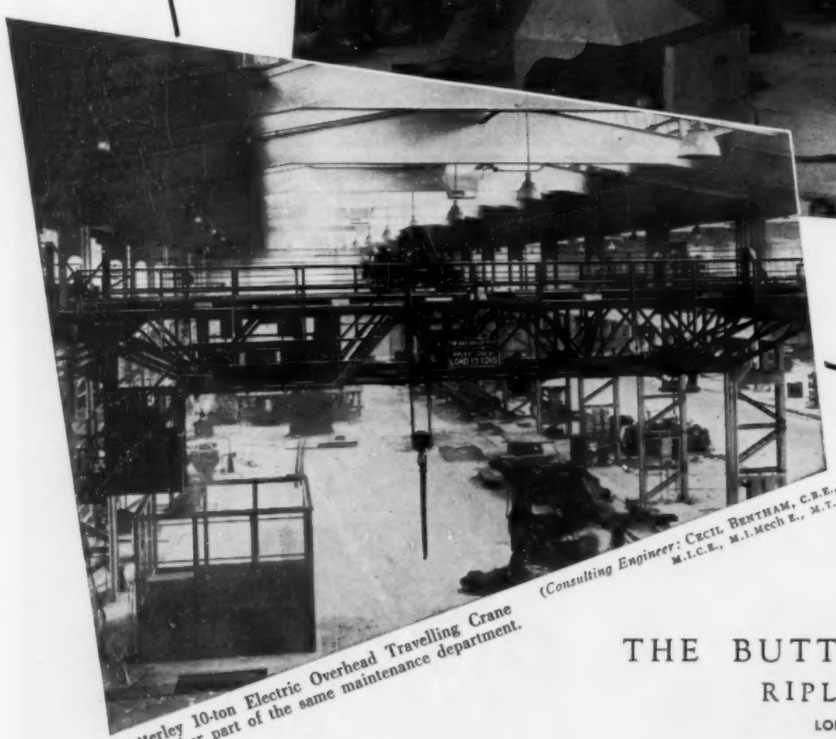


ELECTRIC OVERHEAD TRAVELLING CRANES

by BUTTERLEY

30 ton Butterley Electric Overhead Travelling Crane recently installed in the maintenance department of an important steel works.



Butterley 10-ton Electric Overhead Travelling Crane in another part of the same maintenance department.

(*Consulting Engineer:* CECIL BENTHAM, C.B.E., M.I.C.E., M.I.Mech.E., M.I.)

THE BUTTERLEY COMPANY LIMITED

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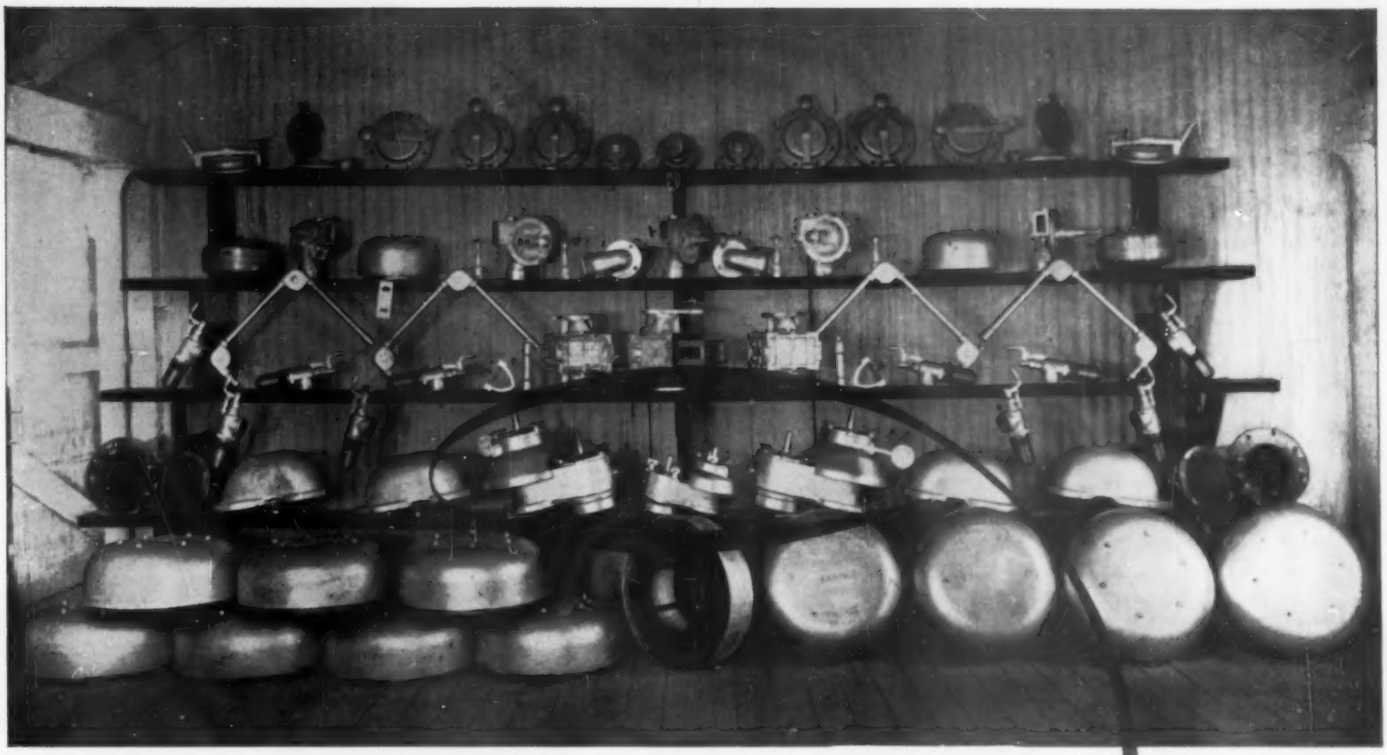

WM. NEILL & SON (ST. HELENS) LTD

Offer British made "VAREC" tank fittings manufactured to the designs of the Vapor Recovery Systems Co., of Compton, California. "VAREC" fittings are being supplied in large quantities for the Petroleum Industry for home and overseas use and the above photograph shows a number of such fittings recently supplied.

Fully descriptive catalogues are available upon request.

★

The conservation vent valve — figure No. 2000.A, shown opposite is designed to afford maximum tank venting for the lowest cost.

Regrindable metal seats or renewable seat inserts ensure extra long service. Pallet drip rings reduce the danger of freezing. The complete valve is simple to inspect and maintain.

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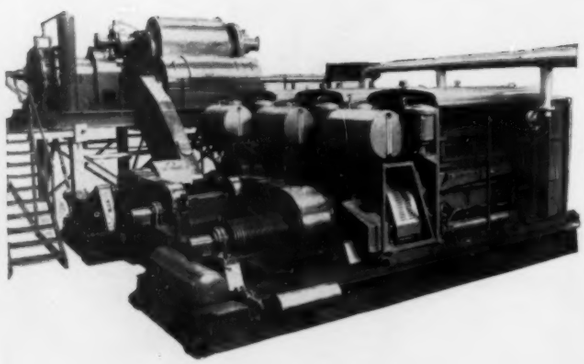

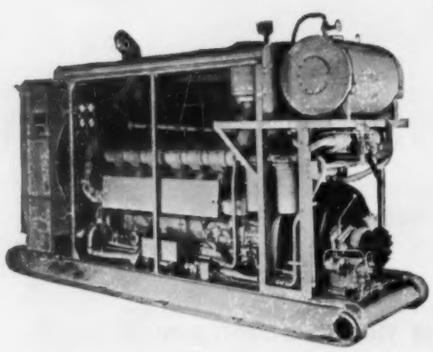

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Paxman "Package" sets are designed to meet the conditions encountered in the oilfields. Reliability, availability for instant use, continuous hard service— these are characteristics of Paxman "Package" sets. Compact and completely self-contained, these units are mounted on a robust skid-type base and have a power range of 100-665 s.h.p.

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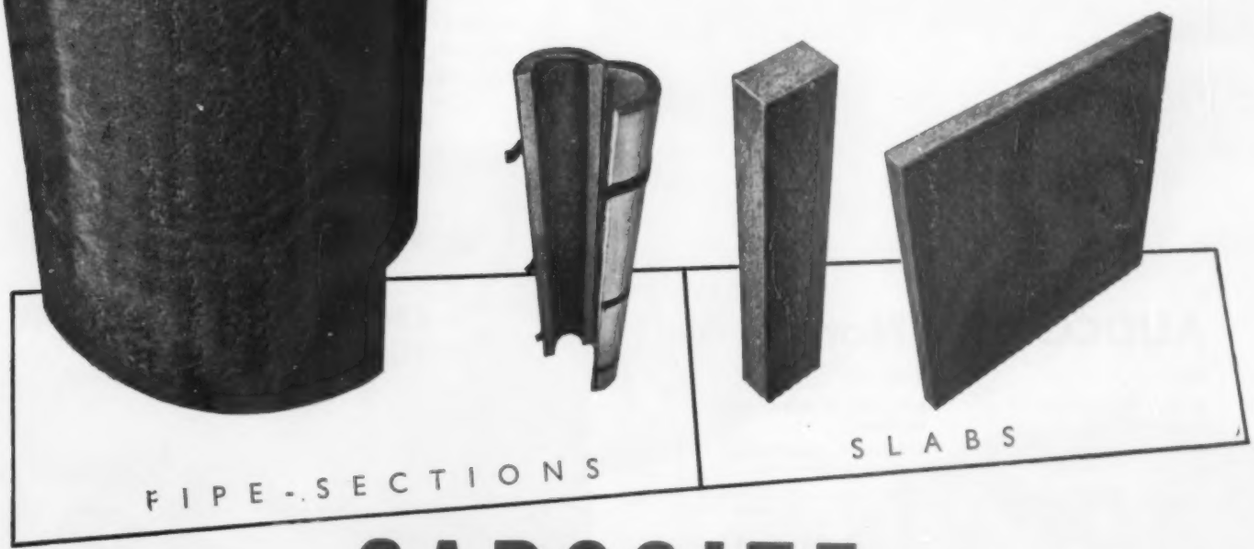

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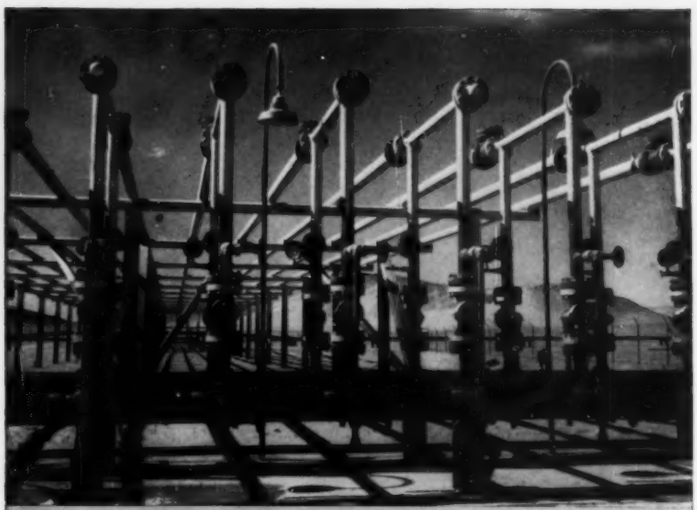
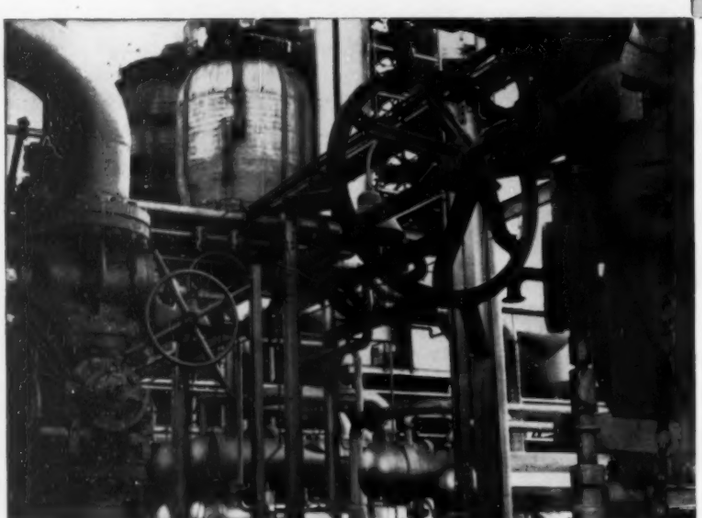


GAS Manifold of Audco-Nordstrom valves installed on gas lines at a separating station in Saudi-Arabia.



OIL Gear-operated Audco-Nordstrom valves on lines carrying rich oil at a refinery in England.

Chances are your plant has lines carrying gas, oil or hot water. Perhaps it uses all three. If so, there is one type of valve that can solve your problems on all of these services—an Audco-Nordstrom Lubricant-Sealed valve.

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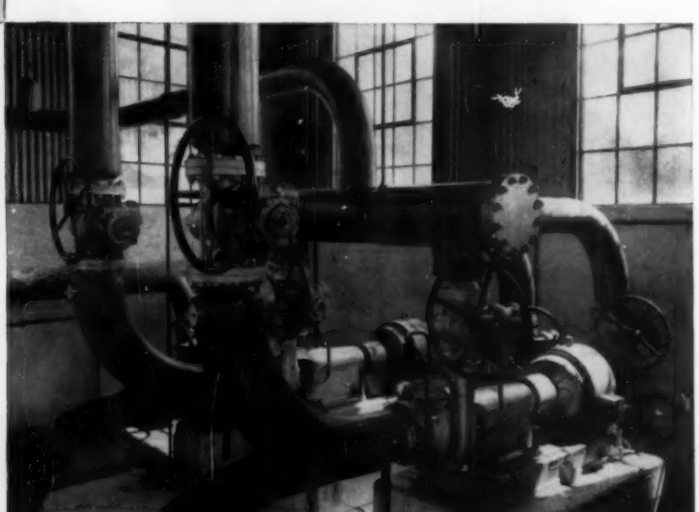
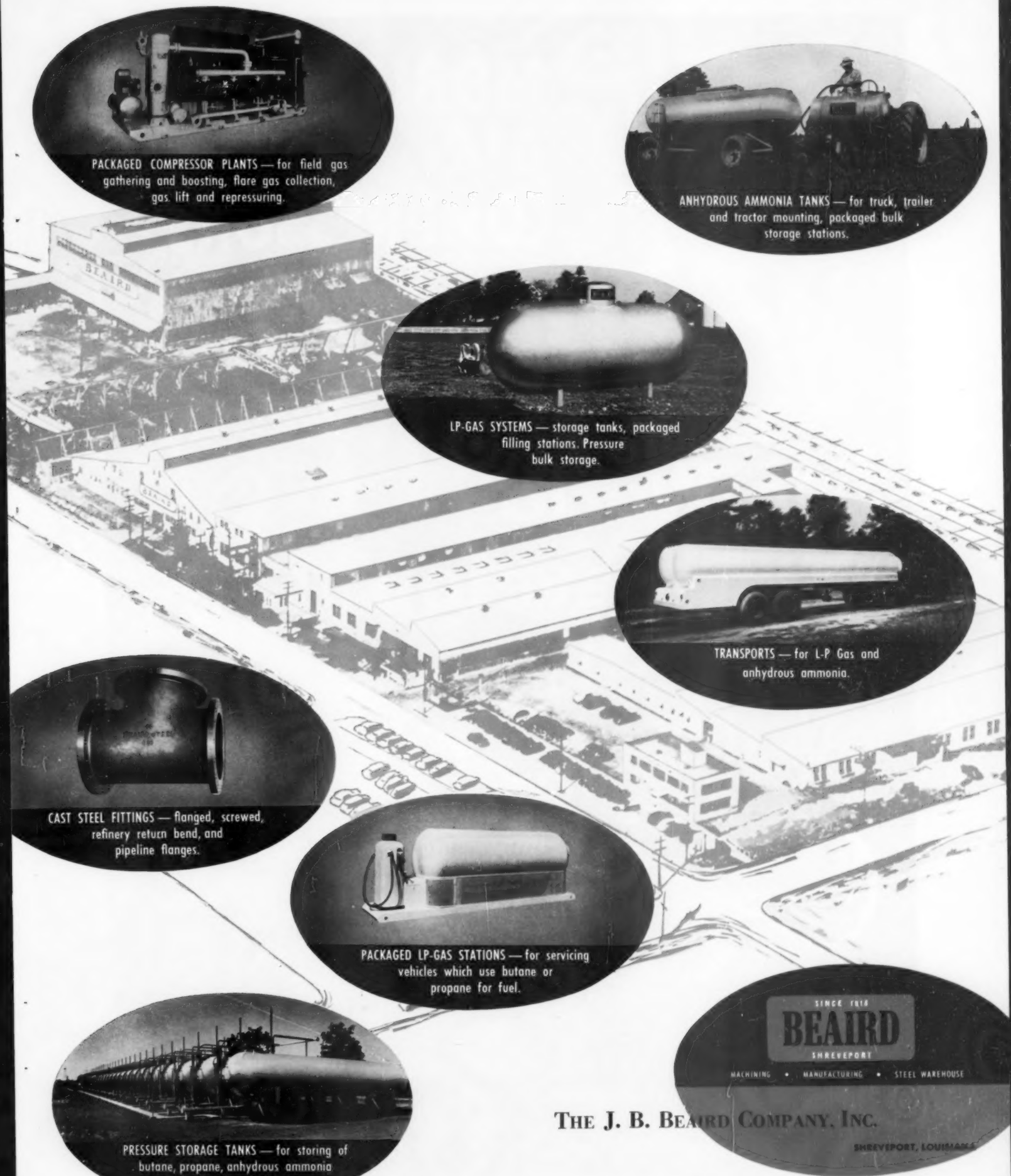


HOT WATER Audco-Nordstrom valves on hot water pump lines in a large boiler house.



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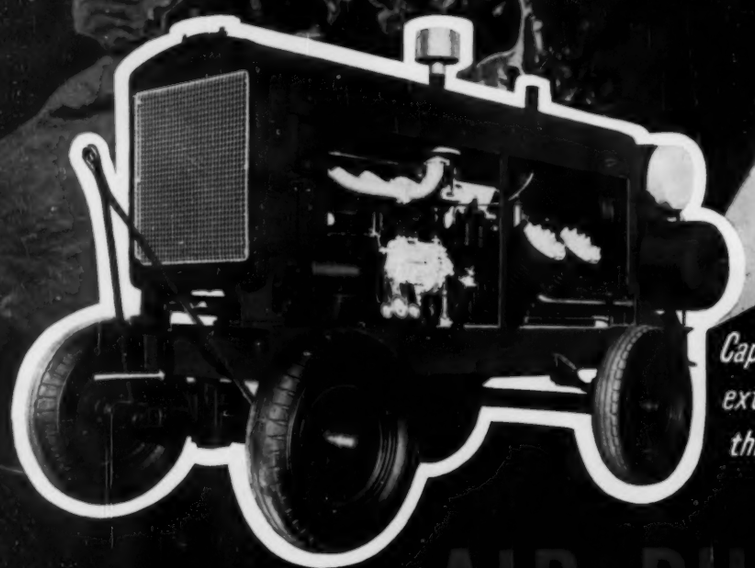

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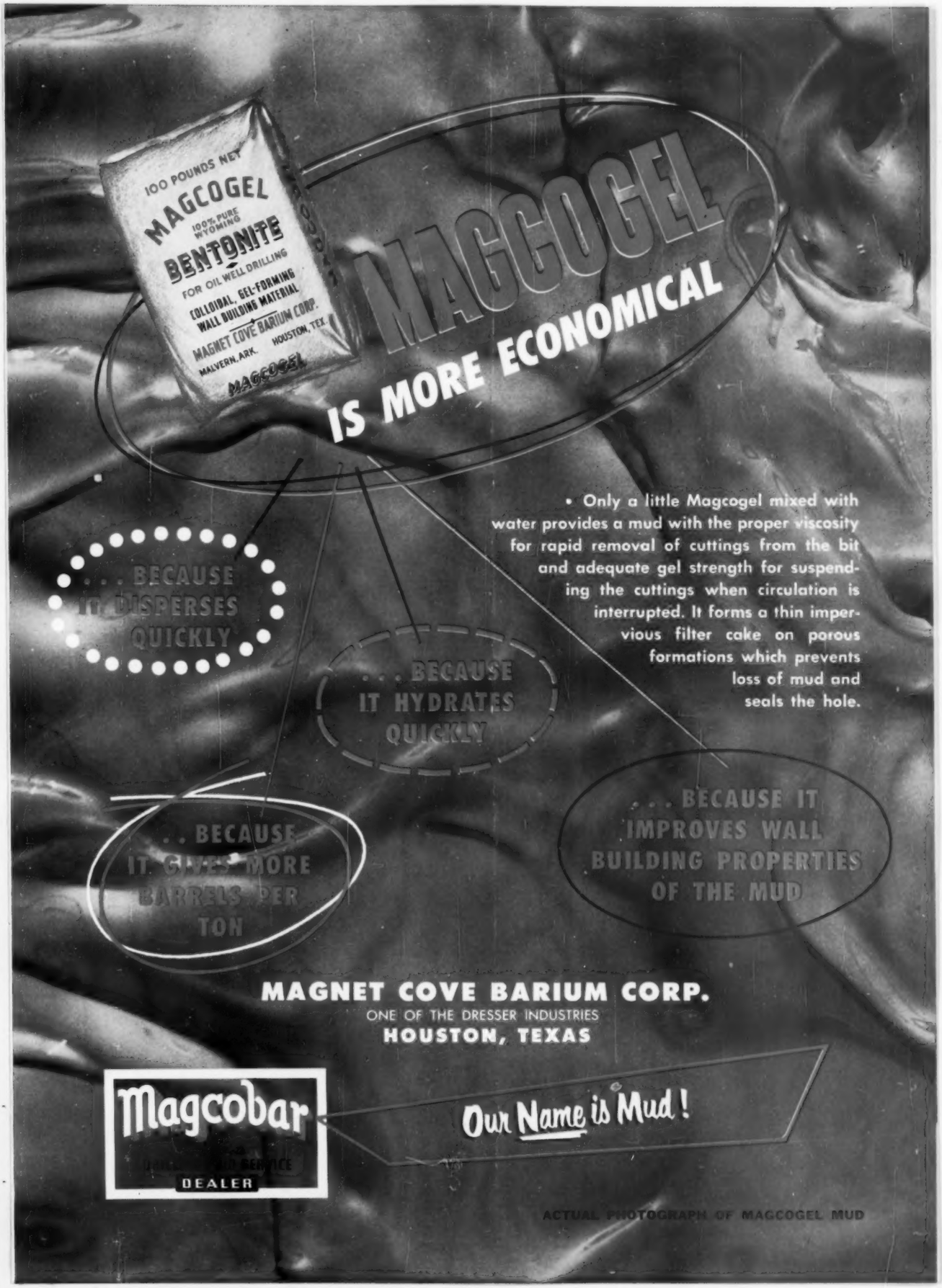
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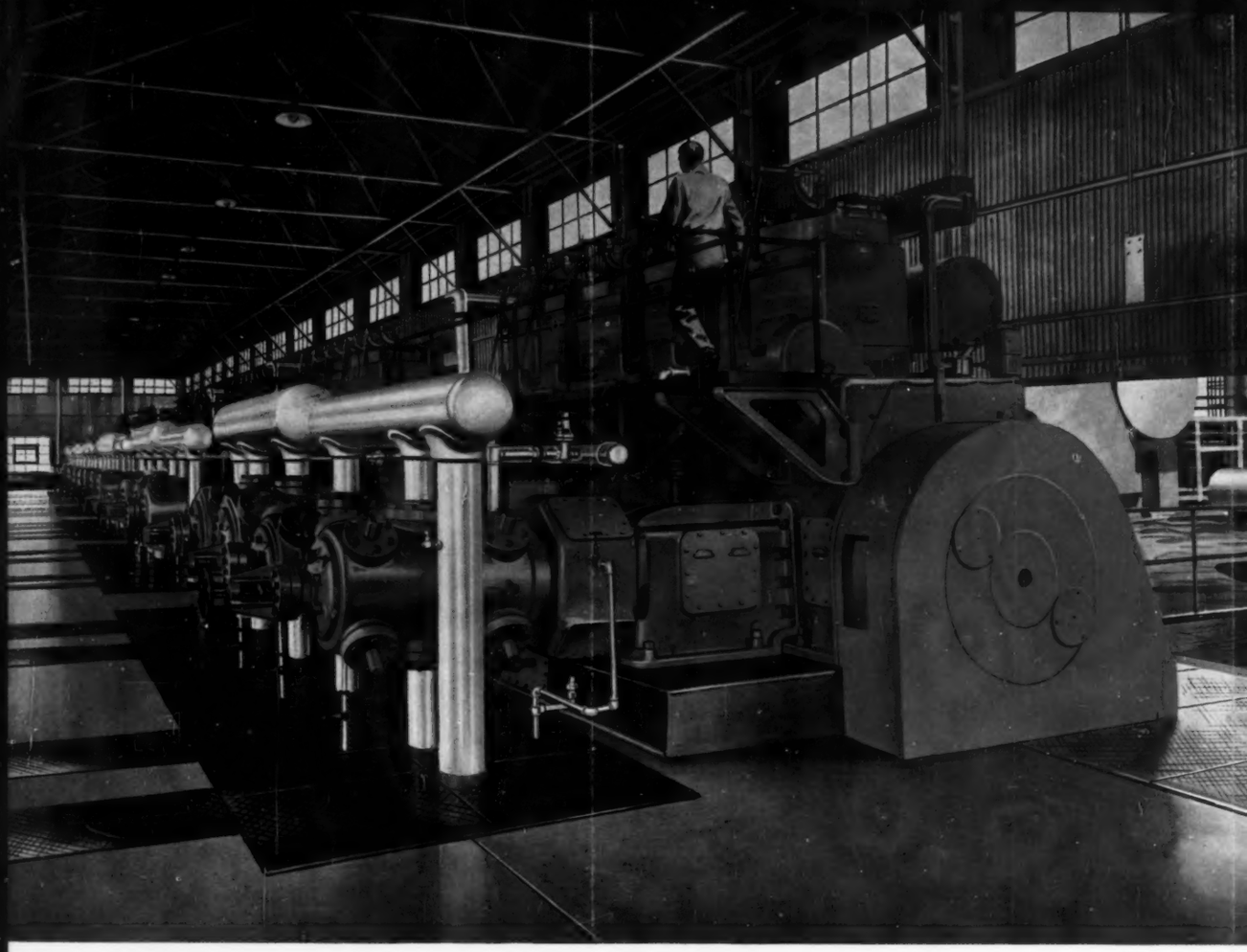

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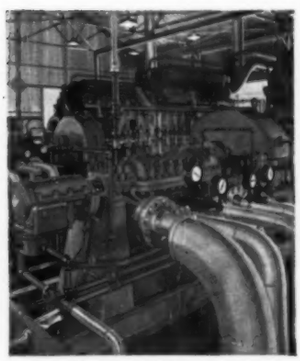

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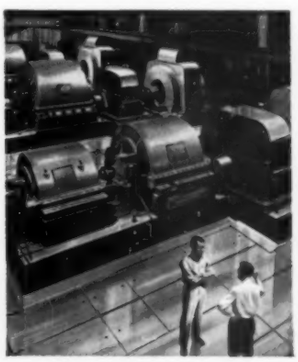

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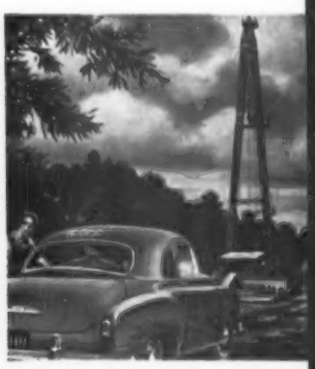

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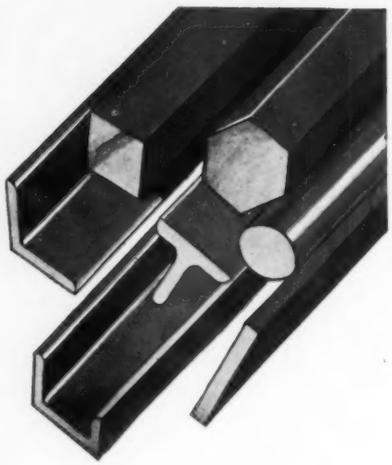

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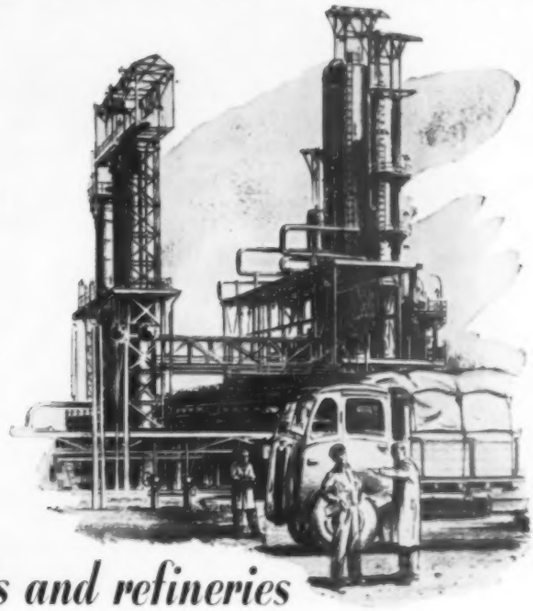

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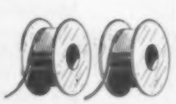

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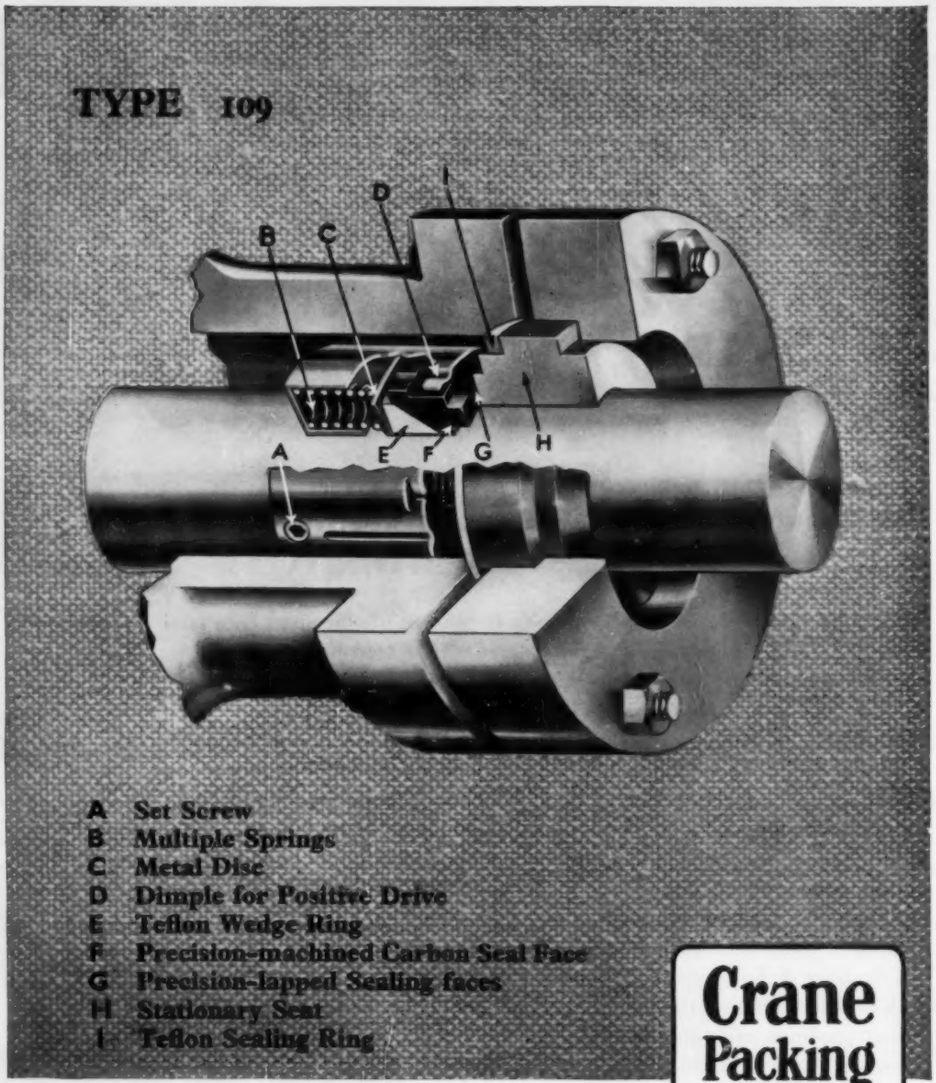

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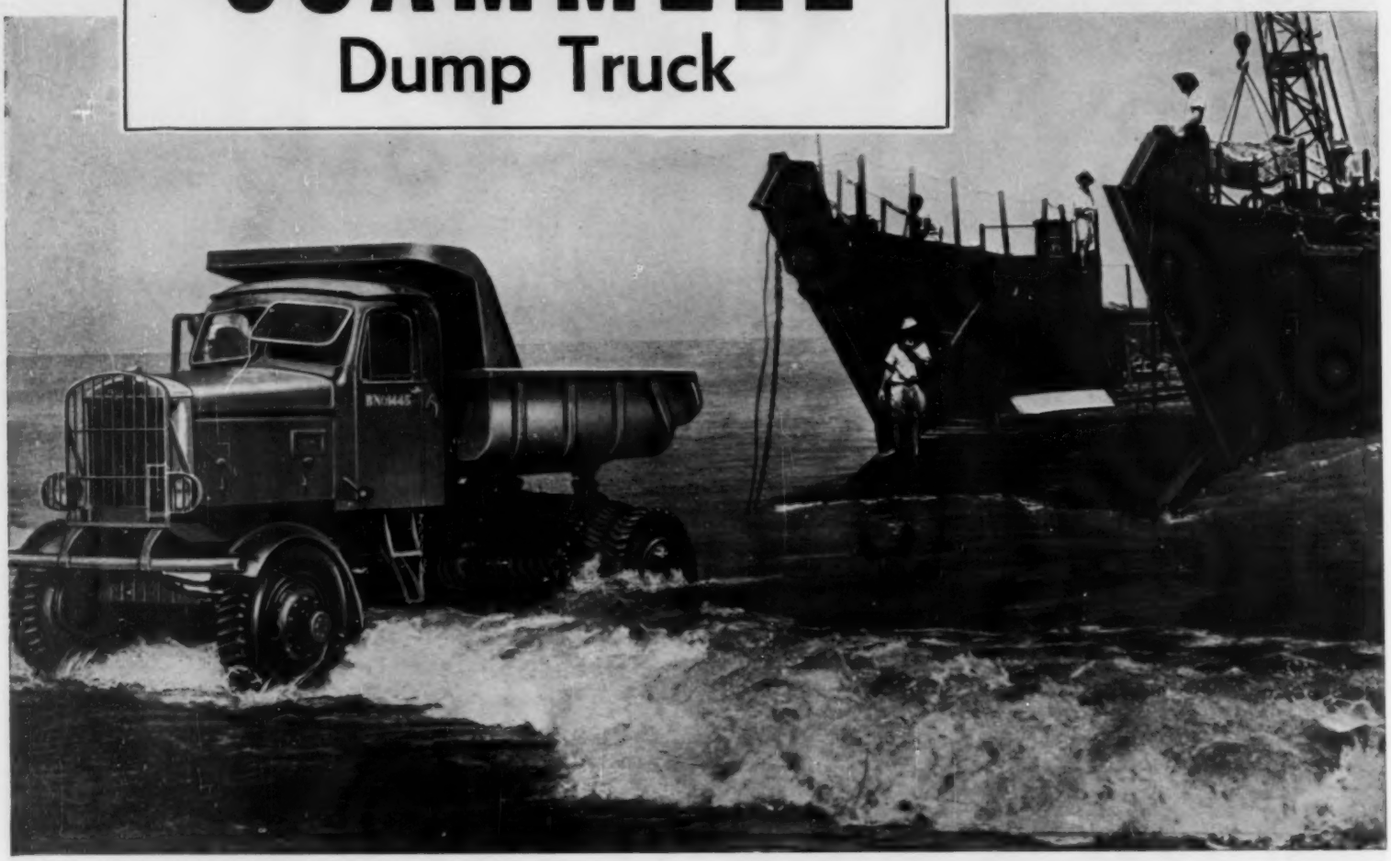

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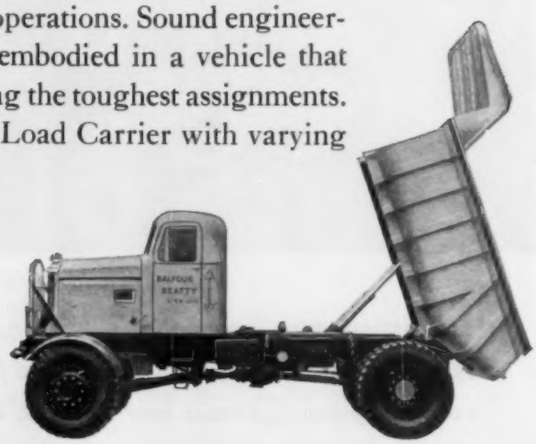

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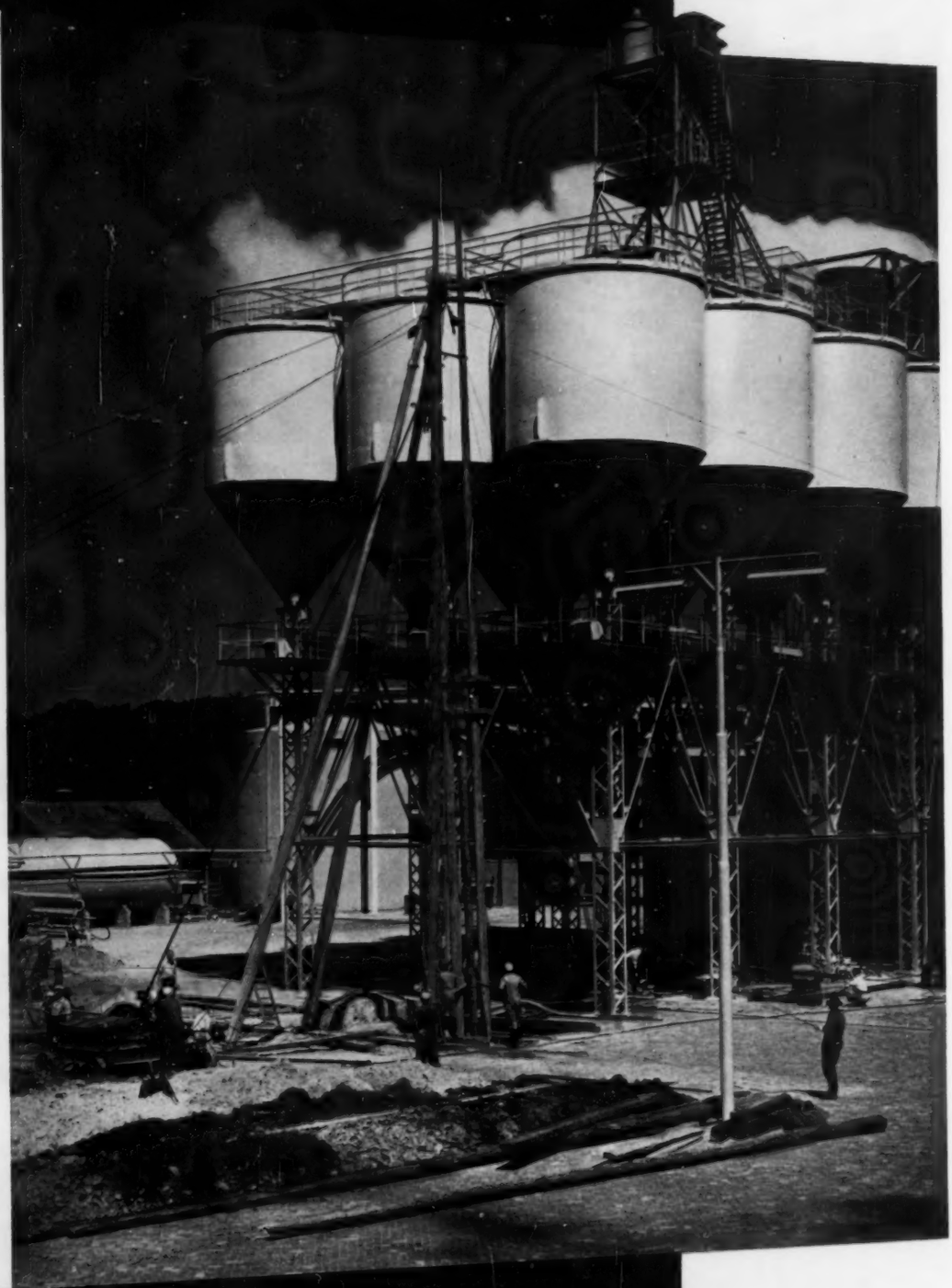

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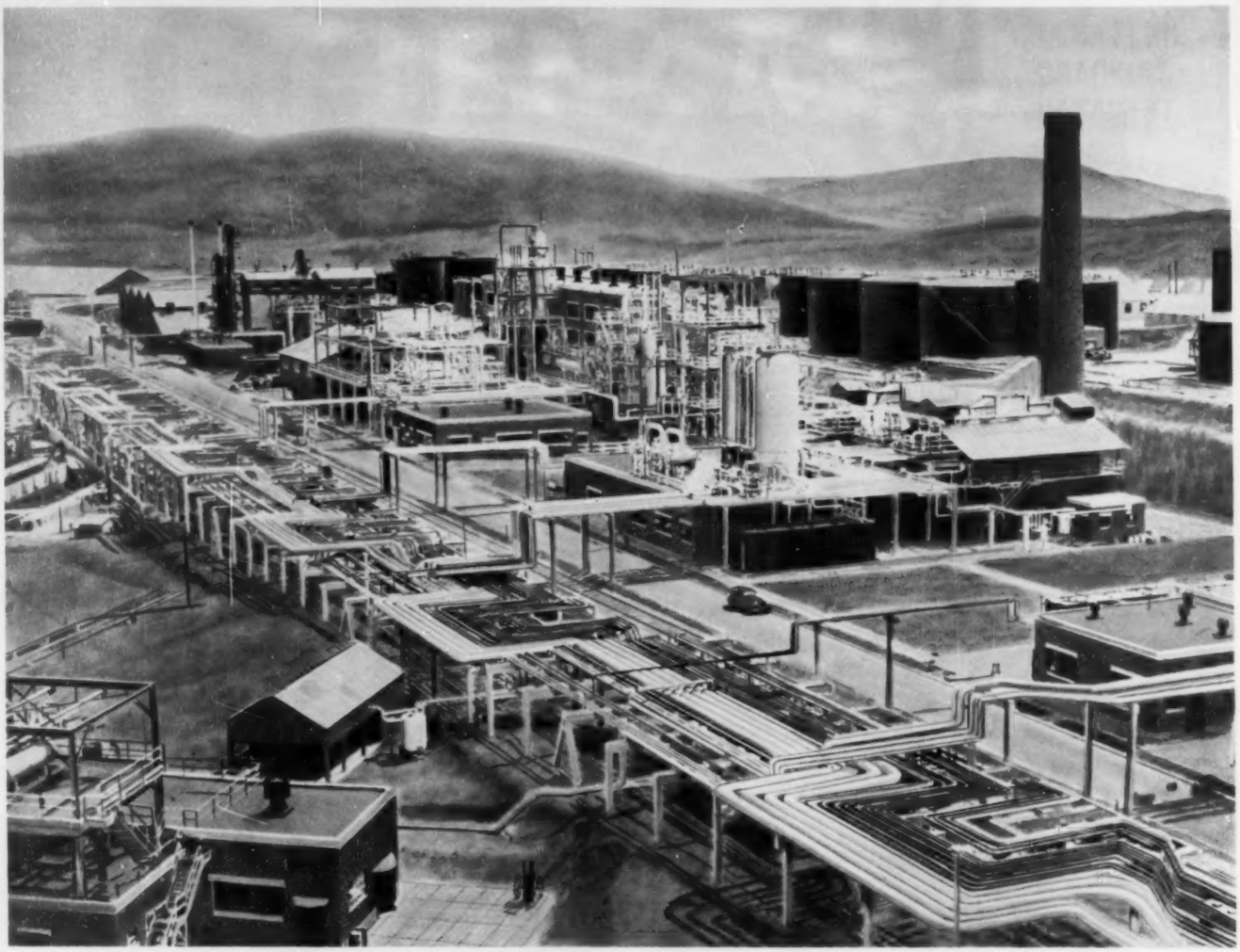
In 67 lands, across half the world, through such developments as these, Caltex is able to supply better fuels and lubricants for industry, for agriculture, and for motoring millions. These require a continual investment of funds and skills, backed by a faith in a better future for free nations.

CALTEX

CALTEX Petroleum Products

SERVING EUROPE • AFRICA • ASIA • AUSTRALASIA



ON A HILLSIDE IN SOUTH WALES

Llandarcy, the Anglo-Iranian Oil Company refinery situated on a hillside near Neath, South Wales, has grown since 1946 from 360,000 tons to 4,000,000 tons capacity per year.

In this development program Badger Process Division of Stone & Webster Engineering Corporation, and its affiliate, E. B. Badger & Sons Limited, have played a major part.

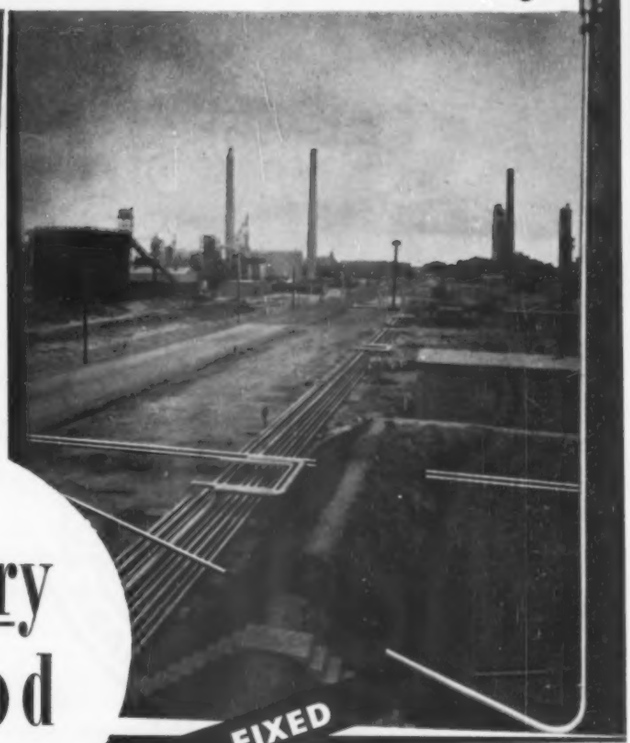
Some of the new and modern facilities already completed or under construction are crude distillation, catalytic reforming, propane deasphalting, furfural extraction, solvent dewaxing, wax manufacturing and clay treating.

STONE & WEBSTER ENGINEERING CORPORATION

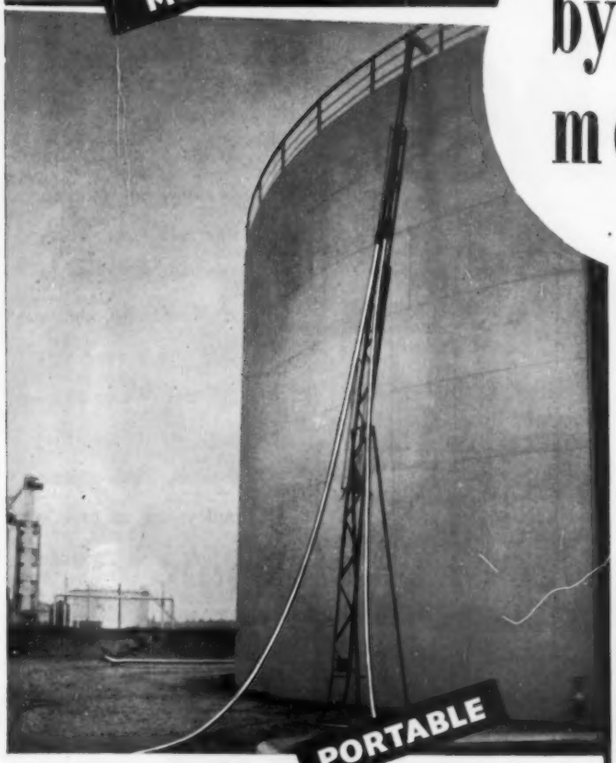
BADGER PROCESS DIVISION

AFFILIATED WITH E. B. BADGER & SONS LIMITED

Fire Protection for the Oil Industry



by every method



MOBILE. Pyrene Mobile Foam CO_2 Fire Tenders are the most advanced fire-fighting vehicles of their kind and are today's answer to major fire dangers in refineries and tank farms. They are designed and equipped to meet specialized requirements. There is also a range of Pyrene Mobile Foam Trailers.

PORTABLE. Pyrene Portable Foam Towers are made to facilitate the application of foam to floating roof tanks or normal storage tanks having fractured roof plates. This equipment is readily manoeuvred and erected by four men. Fitted with self-sustaining winch and foam pourer. Maximum extension 50 feet.

FIXED. Where oils or spirits are stored in bulk, one or other of the various types of fixed Pyrene Mechanical Foam Installations provide the highest degree of practical fire protection. Pyrene specialized equipment in this field is of maximum efficiency, the outcome of many years of experience, and research.

FIRST AID. The Pyrene Company provide the widest range of hand fire extinguishers, designed to meet every class of fire risk throughout the refinery area including laboratories, electrical plant, and office buildings. The range includes Pyrene Fire Extinguishers, CO_2 Extinguishers, CO_2-Dry Chemical Fire Extinguishers, "Phomene" Foam Fire Extinguishers, "Conquest" Soda-acid and Water type Extinguishers.

Pyrene TRADE MARK FIRE FIGHTING EQUIPMENT

The free and impartial advice of Pyrene Fire Engineers is always available to assist you with your fire problems, or illustrated literature will gladly be sent on request to Dept. WP. 1

VICtoria 3401 Cables: "Pyrene-London" **THE PYRENE COMPANY LTD.,** *9 Grosvenor Gardens, London, S.W.1., England*

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Seasonable Good Wishes
and
Good Welding
for
1954

ROBERT JENKINS & CO. LTD.

ROTHERHAM

IF ROPE COULD TALK . . .

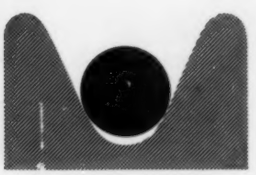
"Stop pinching me, you pulley!"

You can't punish ropes **and** expect to get the best out of them. So watch your PULLEYS and SHEAVES.

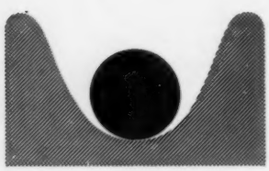
The radius of the groove of a pulley should always be slightly larger than that of the rope passing over it. If the groove is too narrow, it will crush the rope and soon damage the wires.

If too wide, the rope not only wears more quickly at the point of contact but also cuts a false groove in the pulley.

With sheaves, oil the bearings at frequent intervals and check that they rotate freely. A seized up sheave can ruin a rope very quickly. Watch alignment too; see that sheaves, drums and pulleys are set exactly in line with the rope that is working over them.



WRONG
Pulley groove too narrow.



WRONG
Pulley groove too wide.

RIGHT
Pulley groove correct—supporting the rope for 1/3rd. of its circumference.

Write for a copy of a new booklet "If Rope could Talk."

Pin up this announcement where your staff can see it. *It is issued in the interests of longer rope life by*

British Ropes Limited

HEAD OFFICE: DONCASTER
EXPORT SALES OFFICE: 52 HIGH HOLBORN, LONDON, W.C.1

PETROLEUM CHEMICALS DIVISION
NEWS

January ★ *One of a Series of Interest to the Petroleum Industry* ★ *1954*

New Bronze Gasoline Dye Available from Du Pont

The mixing of several gasoline dyes to obtain a desired color has long been an inconvenience to refiners.

Simplify Operations

If you have had this problem in creating a bronze color, it will now be easy to simplify your dye addition operations. Du Pont Oil Bronze makes this possible.

The new Du Pont bronze dye is a free-flowing powder that can be easily handled in dry eductor systems as well as in any other commercial method of gasoline dye addition.

Highly Soluble

Oil Bronze has a total solubility in synthetic gasoline of 4500 grams of dye per 100 U.S. gallons. Speed of solution is extremely rapid.

This new bronze dye is ready for shipment in standard 100-pound containers . . . also in 50-pound, 25-pound and smaller size packages. Samples and full details on Du Pont Oil Bronze are available from any Du Pont Petroleum Chemicals Division representative or district office listed on back page.

BRIEFCASE PRESENTATION PACKAGE

For those desiring a nutshell version of the presentation described in the feature article at right, miniature lube oil show kits are available.

The flannelboard itself measures 9¾ by 13¾ inches. In spite of its compactness, the miniature presentation can be clearly and easily read.

Small enough to be stuffed in a briefcase—with room to spare, they can be easily carried wherever your salesmen go. And they take only a few seconds to set up for an informal desk-top presentation.

If you would like to examine one of these miniature boards, your Du Pont representative can obtain one for you.

New Tool to Help Dealers Promote More Frequent Oil Changes

Unique lube oil show designed by Du Pont is personalized to point up quality features of your own motor oil

The need for frequent oil change—and the value of this service to the car owner—represents a real profit opportunity for your dealers. But getting them to see this opportunity . . . and to *do something about it* . . . has long been a major problem for marketing executives.

IT WILL BE EASY FOR YOUR DEALERS to understand from this flannelboard presentation that "good oil seldom wears out . . . but it can become dirtied to death." Also, that it *pays to change oil frequently.*

To help stimulate your dealers to go after this market, Du Pont has developed a new lube oil show. The theme is "good oil seldom wears out . . . but it can become dirtied to death."

Visual-Aid Tool

The show can be easily presented by any oil company representative. To make it simple, clear-cut and easy to understand, the presentation is built up progressively on a flannelboard. This unique and highly flexible visual-aid technique permits the presentation to be specially tailored to fit any oil company's individual needs.

The Plot

The theme of the presentation is developed to bring out the following points.

Typical lubricating oil molecules must perform five important functions all at once. They must lubricate, protect, cool, seal and clean.

In doing these jobs, good oil seldom wears out in the engine. But even the

ADVERTISEMENT—Prepared for the Petroleum Chemicals Division of E. I. du Pont de Nemours & Company (Inc.)

OVER

PETROLEUM CHEMICALS DIVISION
NEWS

JOHN F. SHAW

Assistant Central District Manager

JOHN F. SHAW was recently appointed assistant manager of the Petroleum Chemicals Division's Central District.

Previous to this assignment, he was a sales supervisor in the Division's West Coast District. He joined the Du Pont Company in 1947.

Mr. Shaw graduated from the University of Texas in 1934 with a B.S. degree in Mechanical Engineering. His first job after college was with the Reed Roller Bit Company. He later became chief engineer of this company's tank transmission plant.

In 1944 he joined the Crum-Brainard Company as chief engineer. There he was in charge of design and manufacturing operations of oil well drilling tools. He then joined the Waldrip Engineering Company as chief design engineer.

Mr. Shaw is a member of the American Society of Mechanical Engineers and the American Petroleum Institute.

CONTINUED

"Lube Oil Show"

best oil eventually becomes *dirtied to death*—by acids, dust, carbon, metal, gum and dilution. And it must be changed.

Adding more clean oil is of little help. Clean oil added to dirty oil makes just one thing—more dirty oil.

Low-Cost Insurance

The speaker delivering the presentation can emphasize the fact that frequent oil changes are cheaper than engine repairs . . . and in the best interest of the customer.

Thus, a dealer can promote his oil change service as a low-cost insurance policy on the life of the car owner's engine. To help him do this, the lube oil show supplies him with a variety of powerful, easy-to-remember selling points.

Personalized For You

The individual points emphasized in the presentation can be personalized to bring out the special quality features of your own brand of motor oil.

A complete script – which can be easily varied to fit the speaker's own presentation style – is supplied with each flannelboard kit. This too, can be personalized to dramatize your own important sales points. Detailed instructions for presentation are also included with the kits.

If you are interested in having one of these personalized lube oil presentations made up for use in your own dealer meetings, we suggest that you talk over the details with a Du Pont Petroleum Chemicals Division representative.

Oil and TBA Purchase Habits Studied in Du Pont Survey

Report No. 5 in Du Pont's continuing study of service station customer buying habits is now being distributed to oil company marketing executives.

This report covers the purchase patterns in oil and TBA items. Like the other reports in the series on gasoline buying habits, and brand and dealer loyalty, this report is based on 3,100 household interviews and 21,000 observations at 1,193 service stations. The survey is national in scope.

Who Buys Oil Where

Of all the motorists surveyed, 74% buy their motor oil at the same place they buy gasoline. The remaining 26% buy oil from a variety of sources – mainly other service stations, car dealers and mechanics' garages. A much smaller percentage purchase at chain stores, mail order houses and from "friends who get it for them."

Brand preference was the chief reason given for purchasing oil at sources other than the regular gasoline supplier. Superior service, convenience and personal friendship were also mentioned as reasons.

Among motorists who have a favorite brand of motor oil, the survey found that quality belief is the chief factor in their choice.

TBA Merchandising

From actual observations, it was found that for every 200 customer stops at service stations, only one of these produced a tire sale. However, it was also observed that only one out of every 1,000 customers was *offered* tires by station attendants. Buying habits for batteries and oil filters are also included in the latest survey report.

It is expected that this Du Pont survey will be extremely valuable to oil company marketers for pinpointing oil and TBA merchandising opportunities . . . and in developing plans to capitalize these opportunities.

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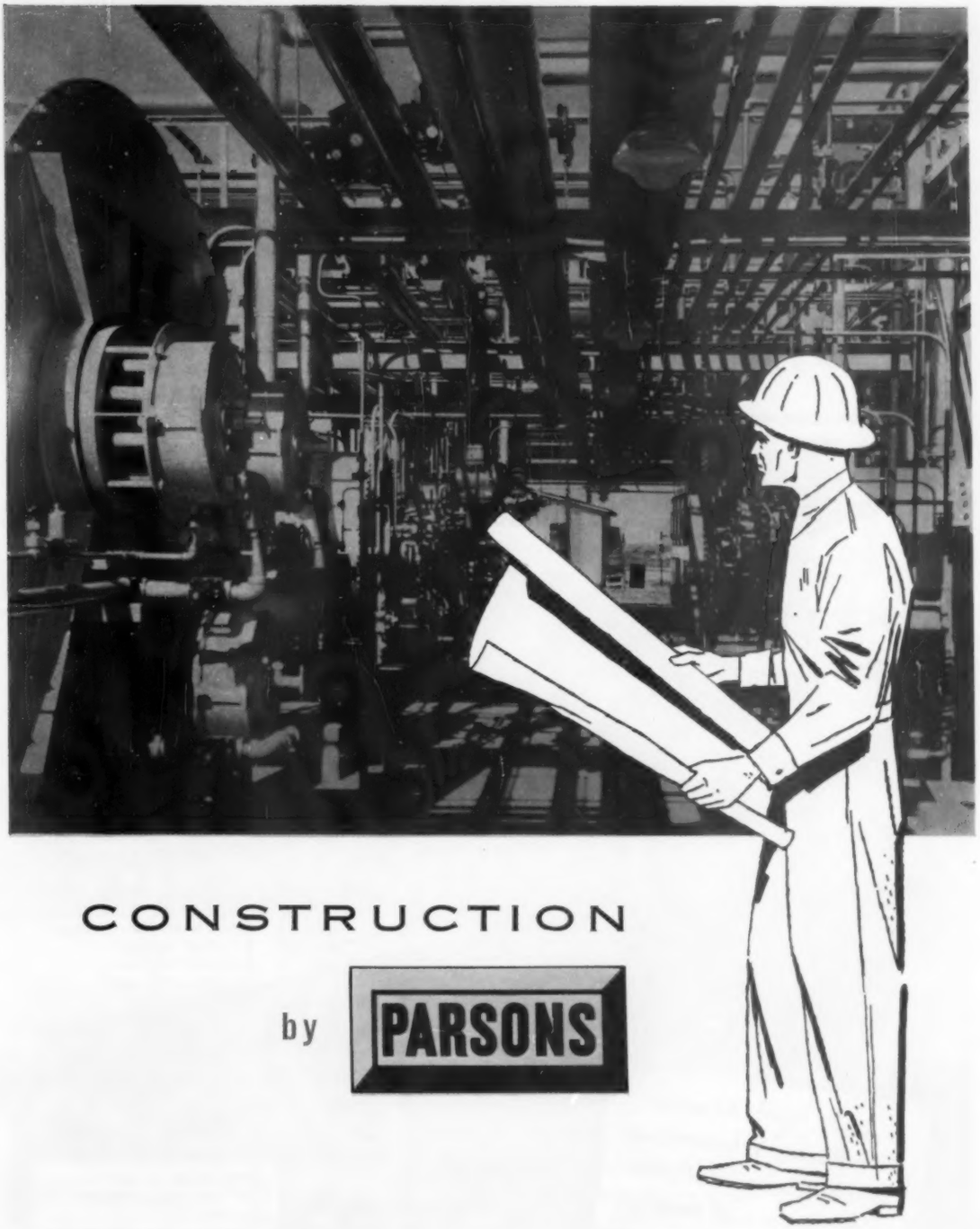

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SOCONY-VACUUM

And Still the Flying Red Horse Keeps Pace!

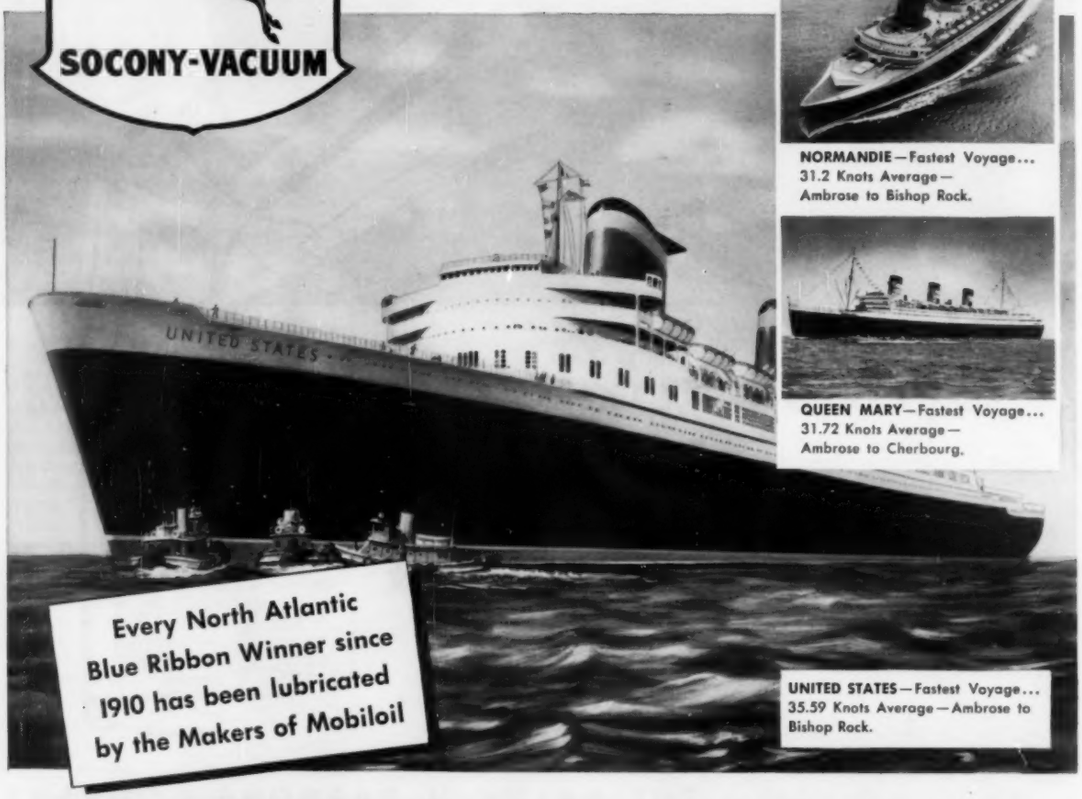
Some Blue Ribbon Winners of the Past!

MAURETANIA—Fastest Voyage... 26.25 Knots Average—Ambrose to Cherbourg.

BREMEN—Fastest Voyage... 27.83 Knots Average—Cherbourg to Ambrose.

NORMANDIE—Fastest Voyage... 31.2 Knots Average—Ambrose to Bishop Rock.

QUEEN MARY—Fastest Voyage... 31.72 Knots Average—Ambrose to Cherbourg.



Every North Atlantic Blue Ribbon Winner since 1910 has been lubricated by the Makers of Mobiloil

UNITED STATES—Fastest Voyage... 35.59 Knots Average—Ambrose to Bishop Rock.

SOCONY-VACUUM OIL COMPANY, INC.

and Affiliates:

MAGNOLIA PETROLEUM COMPANY • GENERAL PETROLEUM CORPORATION

Naphtachimie

in production with new **SD** *process*

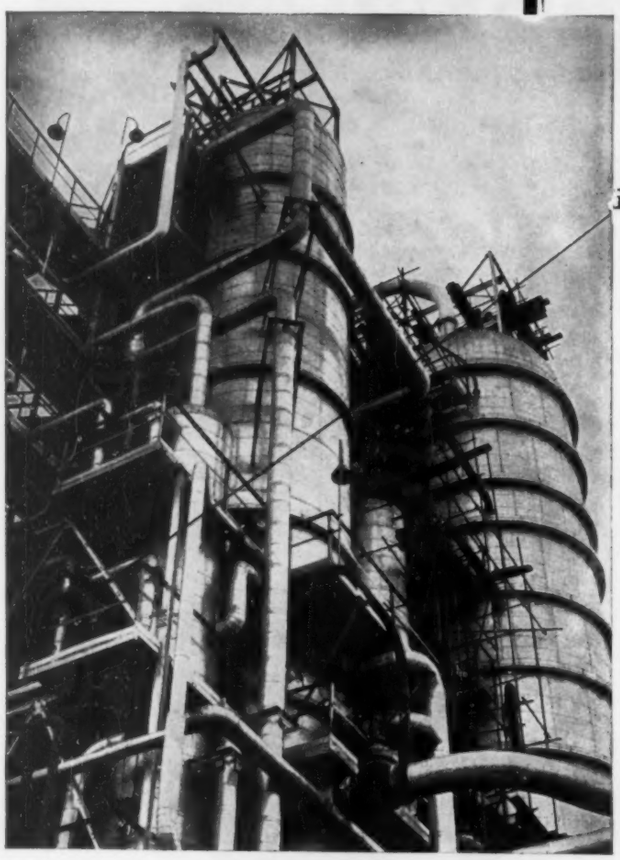
First

in Europe with
Commercial
ETHYLENE OXIDE
by Direct Oxidation

Climaxing 7 years of development, SD's new direct oxidation process for producing ethylene oxide at low cost has now reached successful initial operation . . . at Naphtachimie's new L'Avera plant near Marseille, France, also designed by SD. Naphtachimie is not only first in Europe, but first new producer in the world since 1938 to use such a process. And performance to date, they report, has actually exceeded design specifications. You, too, will profit by utilizing SD's specialized experience in organic chemical plant design. Their services are available to you, on a confidential basis, on any problem involving a process of your own, or one to be procured or developed.

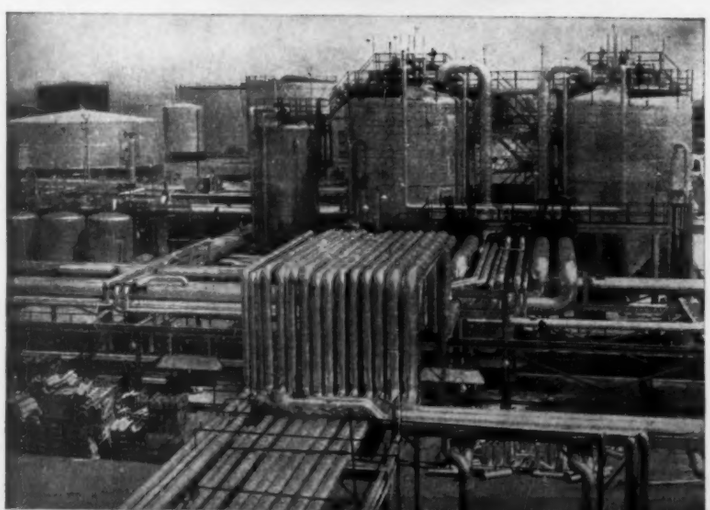
SCIENTIFIC DESIGN COMPANY, INC.
EXECUTIVE OFFICES: 2 PARK AVE., NEW YORK 16, N. Y.
Engineering Offices: Jersey City, New Jersey

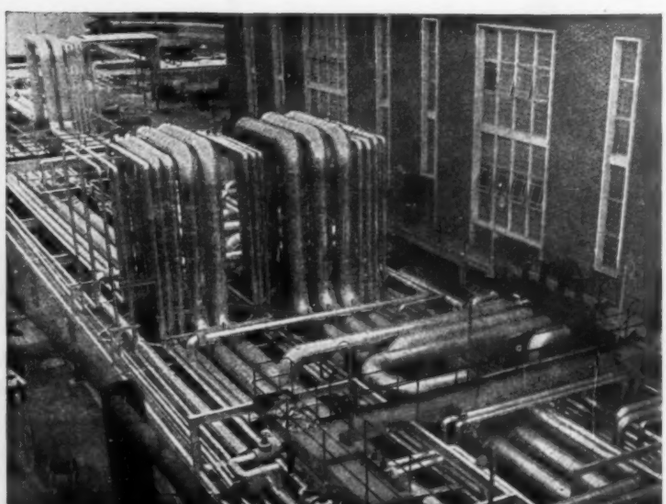
ROCKSIL
INSULATION COVERED WITH SHEET METAL



Kenyon were entrusted with the whole of the thermal insulation at Coryton Refinery. "Rocksil" was used covered with a sheet metal finish.

Write for facts and figures in this interesting new material.





WM. KENYON & SONS (AMERICA) LTD., PERTH AMBOY, N.J., U.S.A.

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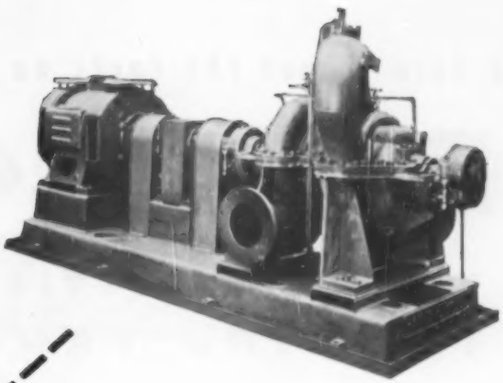
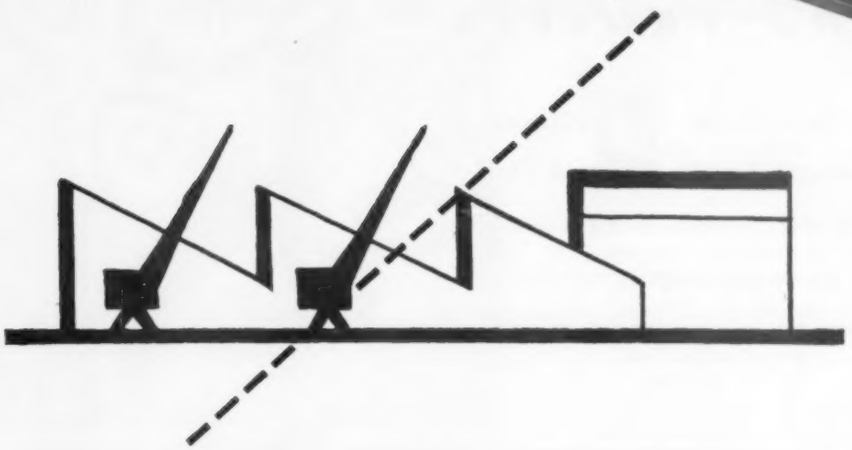
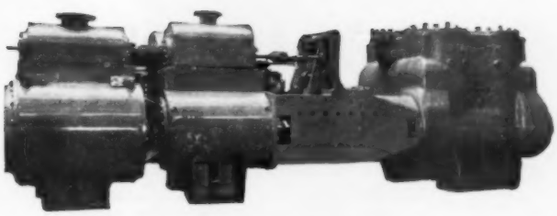
KRp12

Centrifugal or







Reciprocating...

Hayward Tyler make both

For installation on oil tankers, or on land where oil has to be handled in bulk, there is a choice between a reciprocating and a centrifugal pump. As designers and builders of both types, Hayward Tyler offer impartial advice on the choice of pump for your particular duty.

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& CO., LTD.

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TELEPHONE LUTON 3951

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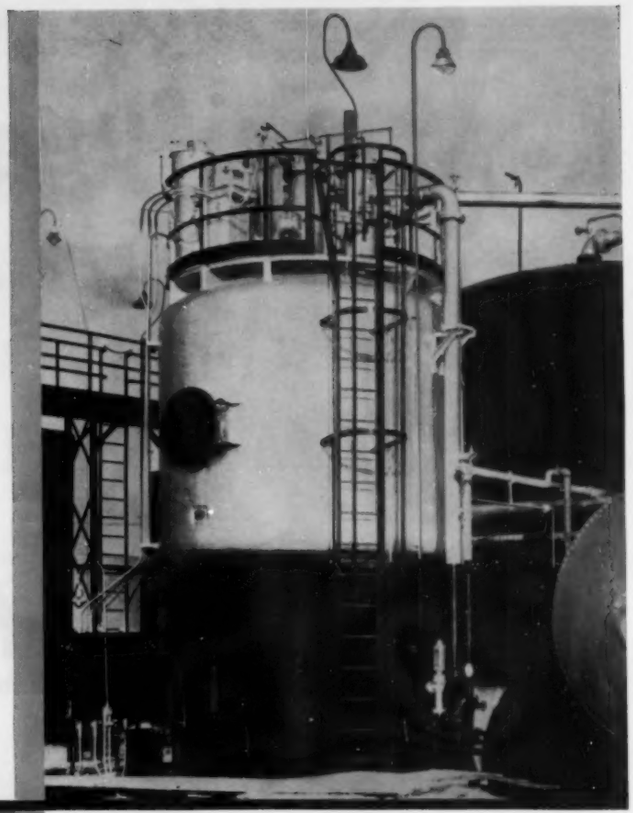
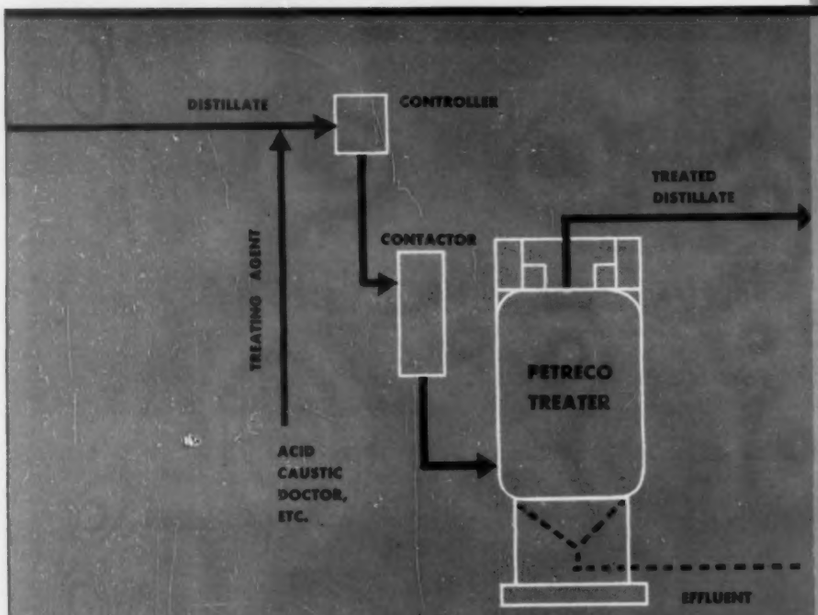
Be sure to get the facts on the ***NEW***

PETRECO

ELECTRIC DISTILLATE TREATING PROCESS

The new Petreco Electric Process takes the guesswork out of distillate treating. It is applicable to acid, alkali or doctor treating of distillate stocks such as naphtha, gasoline, kerosine, cat-cracker charges, cat-cycle oils, diesel fuel and furnace oil.





Flow diagram of typical, single-stage Petreco Electric Distillate Treating Process

ADVANTAGES

COMPACT — requires minimum space, minimum equipment.

ECONOMICAL — uses less treating agent, gives higher product yield.

AUTOMATIC — injection, contacting and separation are automatically precision-controlled.

RELIABLE — the automatic, precision-control assures definite, predictable results.

EFFICIENT—treated distillate is relatively free of pepper-sludge, caustic, doctor solution.

POSITIVE—assures a quick break and complete separation. Amount of acid-sludge is reduced and is more suitable for re-use or recovery.

NON-POLLUTING—the system is entirely closed. There is no chance for irritating fumes to escape.

COMPLETE—water washing is eliminated, except in some unusual cases.

EASILY MAINTAINED — the closed system, with no moving parts, stays clean; does not break down.

PETRECO

ELECTRIC PETROLEUM PROCESSING

CRUDE OILS: REMOVAL OF SALTS, SOLIDS, OTHER IMPURITIES; DEHYDRATING
DISTILLATES: ACID TREATING; CAUSTIC TREATING; DOCTOR TREATING
FUEL OILS: DESAPONIFICATION, ASH REMOVAL

For complete information, call or write

PETROLITE CORPORATION

PETRECO DIVISION

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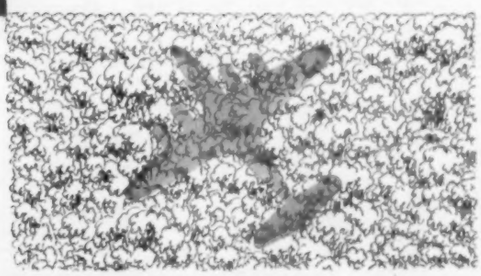
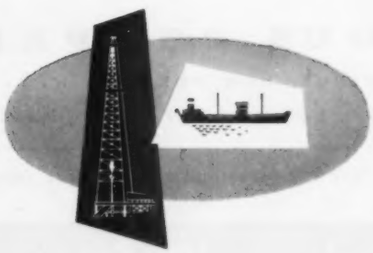
STANDARD-VACUUM

When night steals over the paddy fields of Java, kerosene burns in the farmers' lamps to drive the darkness away • When an airliner sets down in Bangkok, hundreds of gallons of high octane aviation fuel pour into the tanks which feed its powerful motors • A road reaches into the back country of Luzon; asphalt from oil gives it a hard, smooth surface • And when a tramp steamer sails from Mombasa, bunker oil may turn the screws as they churn the waters of the Indian Ocean.

From Tokyo to Karachi; from the minerally rich highlands of Southern Africa to the coastal cities of Australia and New Zealand, the varied petroleum products of Standard-Vacuum weave in some way through the whole pattern of living.





STANDARD-VACUUM OIL COMPANY

A name that stands for "Progress" in the East

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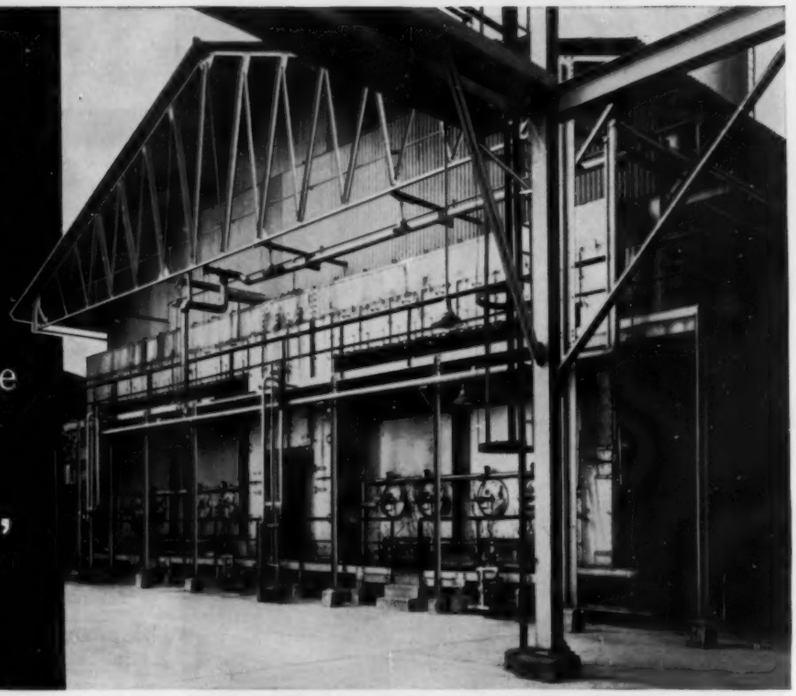
SOUTH PACIFIC ISLANDS • SOUTH WEST AFRICA • TANGANYIKA • THAILAND • UNION OF SOUTH AFRICA

Oil Heater Candidate For A Performance "BLUE RIBBON"



IT'S this Lummus Crude-Vacuum Oil Heater, on the job at the Paulsboro, N. J. refinery, of Socony-Vacuum Oil Company, Inc.

This unit was placed in service in November 1949. Except for a seven-day shutdown early in 1951, solely for plant considerations, ***its first run was for 3½ years.*** When the heater was opened it was found to be in good condition . . . with remarkably little maintenance necessary considering the unit's time in operation.

With a design duty of 83,000,000 Btu/hr., the heater during the last 3½ years has handled approximately 40% *more* than design rating. Refinery people say the heater could operate at even greater capacity.

Operating results like these at Paulsboro uphold Lummus' reputation as designers and fabricators of oil heater equipment for refineries, chemical, and petrochemical plants. In addition to superior performance, Lummus oil heater installations are marked by ease of operation and flexibility necessary to allow frequent switching of stocks.

Have we suggested a few important reasons why a Lummus Oil Heater will fit into your processing picture? We'll be pleased to have our specialists talk it over with you.

THE LUMMUS COMPANY

385 MADISON AVENUE, NEW YORK 17, N. Y.

HOUSTON • CHICAGO • LONDON • PARIS • CARACAS

DESIGNING ENGINEERS AND CONSTRUCTORS FOR THE PETROLEUM AND CHEMICAL INDUSTRIES

Across the Sea . . .

Shown at right in this photograph are Lummus Hot Oil Belt Heaters which satisfy by means of a circulating hot gas oil stream all heat requirements for the lube oil plant of a modern refinery at Dunkirk, France. This installation, as in the case of others similar to it, is characterized by a low initial investment since it eliminates a number of smaller heaters with their attendant engineering and erection costs.

VOL. 25, NO. 1, JANUARY, 1954

World Petroleum

THE MANAGEMENT PUBLICATION OF THE INTERNATIONAL PETROLEUM INDUSTRY

FOUNDED BY RUSSELL PALMER

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O. F. Cozier, Mid-Continent Advertising Manager, 515 McBirney Bldg.
(Tel. 4-5555)

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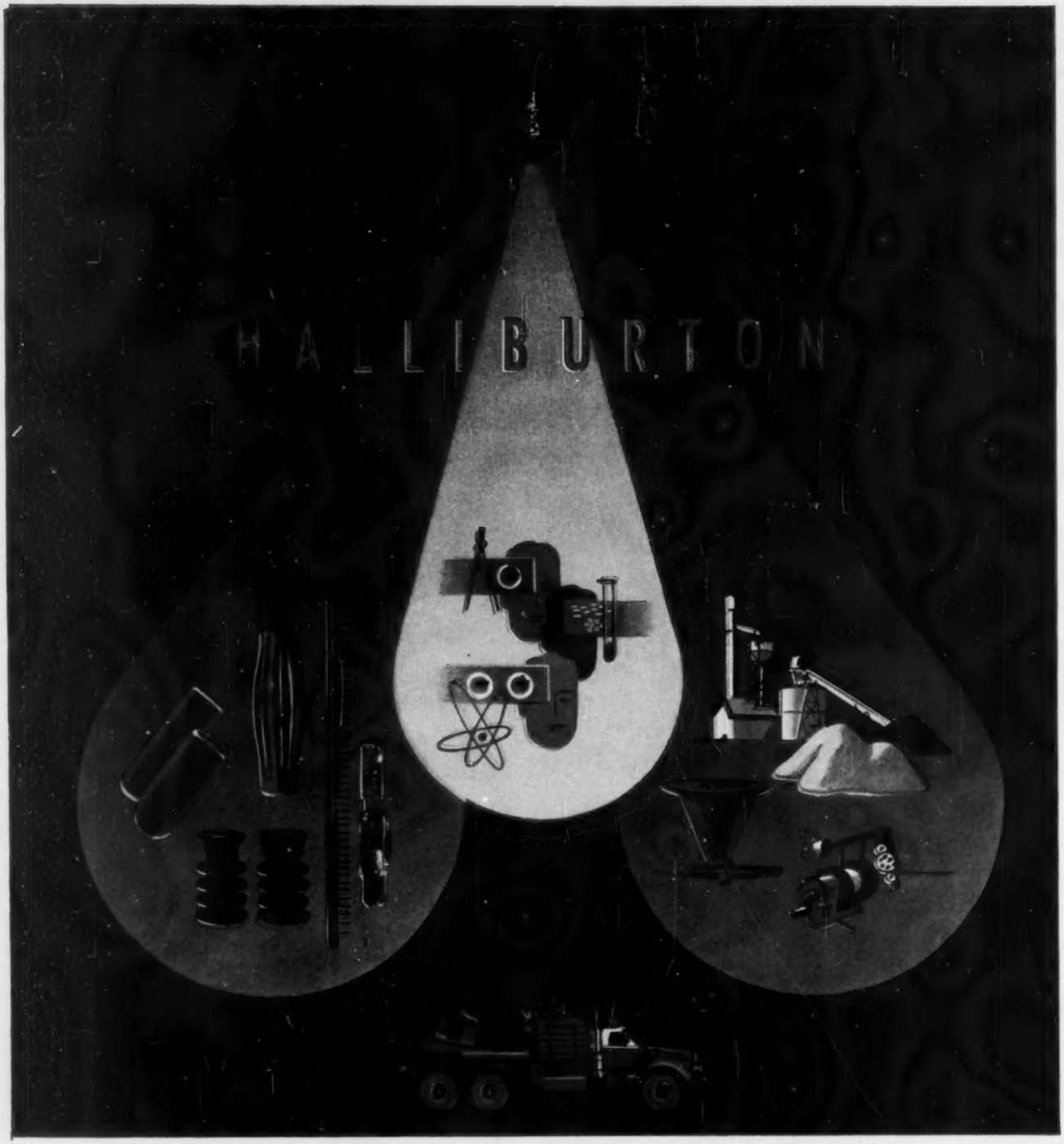
THIS MONTH'S COVER

Sunset on the Gulf of Mexico silhouettes Magnolia Petroleum Company's offshore barge No. 2. Photograph by R. I. Nesmith. Color plates are reproduced through the courtesy of the editors of *The Flying Red Horse*, house magazine of Socony-Vacuum Oil Co., Inc.



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DUNCAN, OKLAHOMA

VIEWS FROM TWO ANGLES

IN A TRIP COVERING a broad section of the United States during the past several weeks, the writer of these lines took occasion to ask a number of representative business men their opinions as to the outlook for the year now beginning. Not all of the men interviewed were members of the oil industry, though a substantial proportion are more or less closely associated with one or another phase of its operations. As a group, however, they constitute a fairly representative cross-section of American industry. Among them were bankers, builders, manufacturers, officials of automotive, steel and transportation companies and, as stated, a considerable admixture of men whose chief concern is with petroleum.

Before the trip was half over a surprising pattern of similarity evolved in the views expressed in answer to the question "What of 1954?" So long as the discussion related to the outlook for business in general, a note of uncertainty ranging from caution to downright pessimism prevailed in the replies. Some slackening of activity, a fall in consumer demand and a possible decline in prices were envisioned. Various reasons for this expectation were advanced—overproduction, heavy inventories, market saturation by certain products.

When it came to a question of the outlook for the individual's particular business, however, the prospect was entirely different. "We are not slowing our activities in any particular; have no plans for cutting down our program of expansion; in fact we anticipate a very busy year, as good as 1953 which was one of the best in our experience." That, with some variation, was the response given.

The general manager of an automobile manufacturing company discounted assertions that too many cars were being produced. He quoted statistics as to the number of motor vehicles ten to twelve years old still in use, declared that his company's payroll was at an all-time peak with heavy expenditure for overtime, and predicted that sales during the coming twelve months would surpass those of 1953. He foresaw that competition would be keener and that it no longer would be possible to pass on to buyers cars loaded with all sorts of extra equipment which the customer might not want, but that, he explained, was merely a transition to normal.

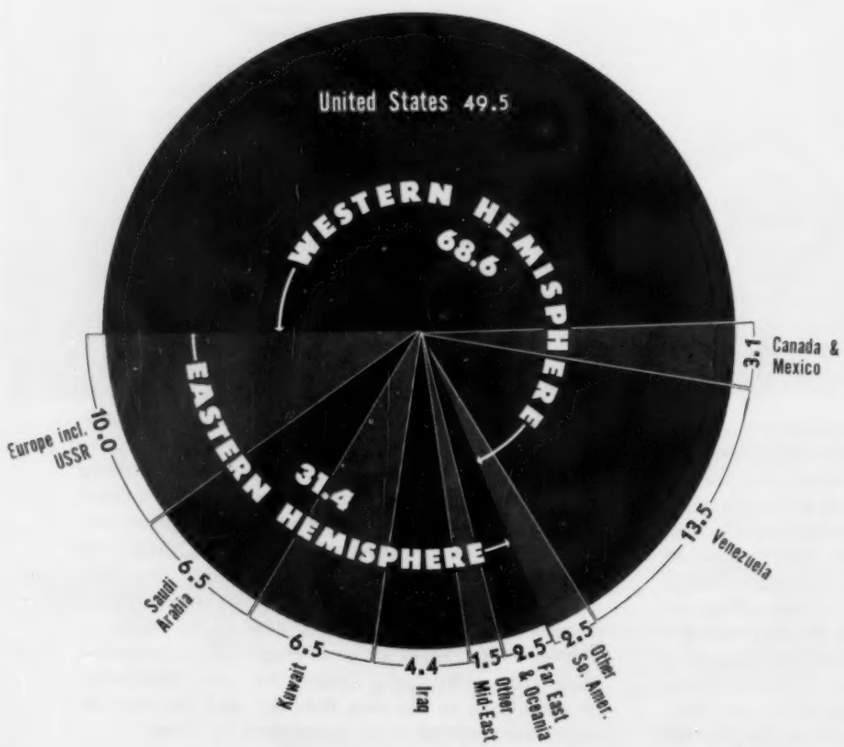
Steel company officials predict that with the enlarged facilities now installed they will produce and sell five to ten percent more tonnage in 1954 than during the twelvemonth just ended, and can do it without being forced to operate above rated capacity as during the period of acute scarcity.

At no point did members of the oil industry acknowledge that they are giving consideration to a letdown in current activities. They anticipate that the number of rigs in operation will show a seasonal increase as the year advances and that the total of wildcat and development wells drilled will be about the same as during the past year or perhaps slightly higher. With the settlement of the tidelands controversy a substantial enlargement of marine exploration is in prospect. Worldwide entension of the search for oil is arousing greater interest in the export field.

On the refining side of the industry, where some slowing down was expected after the rapid pace of expansion during the past few years, sustained activity is looked for. Construction of new refineries definitely scheduled, particularly in areas that have been insufficiently supplied heretofore, stands at an impressive figure and the movement to install in existing plants new units in order to take advantage of processes and equipment that will improve the quality of products or aid in more efficient or more economical operation is as wide as the industry itself. Investment on this account as thus far reported approximates the records of the past two years.

The apparent paradox in the cautious and uncertain attitude regarding the general industrial outlook and the confident tone among individual businessmen as to the prospect ahead for their own operations, a confidence that is particularly strong among members of the petroleum and other related industries, is explainable perhaps by the persistent and widely voiced predictions of an approaching recession or depression. Without subscribing fully to the theory that the American people are in danger of talking themselves into a depression, it is understandable that the average citizen measures these dire predictions against his own knowledge of conditions in his own industry and his own locality and refuses to be stampeded by them.

World crude production tops thirteen million barrels daily in 1953



WORLD production of crude oil increased 5.6 percent in 1953 to 13,028,200 barrels daily according to estimates prepared by WORLD PETROLEUM on the basis of most recent reports available late in December. In 1952 production had averaged 12,336,700 b/d.

Natural gasoline production in 1953 averaged about 816,000 b/d as compared with 736,000 b/d in 1952, an increase of 10.9 percent.

Above ground stocks of petroleum increased for the third consecutive year. Accumulation in 1953 was less than in the previous year as a result of the reduction in crude production in the fourth quarter.

For the year as a whole it is estimated that total liquid stocks increased about 60 million barrels compared with 100 million barrels in 1952. Accumulation in the United States was 33 million barrels according to an advance estimate by the U. S. Bureau of Mines. This compares with a U. S. inventory rise of 59 million barrels in 1952. The growth in above-ground stocks was not as rapid as the rise in consumption, U. S. stocks rising 4.9 percent and total demand 5.1 percent. Domestic demand was 6 percent higher in the United States.

Production in the eastern hemisphere continued to grow more rapidly than in the west with the result that supply now is nearly as great as demand. For the first time in history, the eastern hemisphere is capable of supplying all its oil requirements. It did not quite do so on balance in 1953, but the margin of deficiency was not great.

Increase in eastern hemisphere production in 1953 was 13.7 percent to 4,090,900 b/d while in the western hemisphere the growth in output was 2.5 percent to 8,937,300 b/d. On a volume basis the rise in eastern crude was more than twice that in the west. Eastern production increased 494,800 b/d and western output 196,700 b/d.

All of the increase in western production was in North America. Canadian crude supply rose 53,200 b/d to 220,200 barrels, an increase of 31.8 percent. Completion of the Trans Mountain pipe line and the Interprovincial extension prevented the usual fourth quarter drop in Canadian activity.

United States production increased 189,500 b/d or three percent despite the drastic cutback in the fourth quarter ordered by various state proration authorities to prevent inventory accumulation.

WORLD CRUDE OIL PRODUCTION
(Thousands of Barrels Daily)

				1953				
	1939	1951	1952	First Quarter	Second Quarter	Third Quarter	Fourth Quarter	Year's Total
North America								
United States	3,465.7	6,149.0	6,264.5	6,549.3	6,476.9	6,581.0	6,209.0	6,454.0
Canada	19.1	130.5	167.0	167.3	201.5	265.6	246.0	220.2
Mexico	162.0	210.2	214.8	216.2	190.1	190.0	190.0	196.6
Total	3,646.8	6,489.7	6,646.3	6,932.8	6,868.5	7,036.6	6,645.0	6,870.0
South America								
Venezuela	567.0	1,704.6	1,803.9	1,742.6	1,744.3	1,707.7	1,848.6	1,760.8
Colombia	65.5	105.3	105.8	109.8	107.9	106.5	108.0	108.1
Argentina	51.0	66.9	68.2	74.8	77.7	77.3	78.0	76.9
Trinidad	52.8	57.1	57.4	60.2	61.5	60.5	61.0	60.8
Peru	37.1	44.0	45.5	43.6	44.8	45.1	45.0	44.6
Ecuador	6.3	7.4	7.7	7.8	8.1	8.0	8.0	7.9
Chile	—	2.0	2.2	3.1	3.1	3.3	3.4	3.2
Brazil	—	1.9	1.9	2.6	2.6	2.7	2.8	2.7
Bolivia	0.6	1.4	1.4	1.4	1.3	1.4	1.4	1.4
Cuba	0.3	0.3	0.3	0.1	0.1	0.1	0.1	0.1
Total	780.6	1,990.9	2,094.3	2,046.0	2,051.4	2,012.6	2,156.3	2,066.5
WESTERN HEMISPHERE	4,427.4	8,480.6	8,740.6	8,978.8	8,919.9	9,049.2	8,801.3	8,937.3
Europe & Africa								
Romania	128.5	100.0	90.8	90.0	90.0	95.0	95.0	92.5
Austria	11.7	44.0	55.0	58.0	60.0	60.0	60.0	59.5
Germany	12.3	26.5	33.9	38.3	41.8	44.0	45.0	42.3
Netherlands	—	13.6	13.6	13.1	15.9	16.2	17.0	15.5
France	1.4	5.6	6.6	6.7	6.7	7.3	7.5	7.1
Hungary	3.0	10.5	9.5	14.0	14.0	14.0	14.0	14.0
Poland	10.7	3.7	4.0	4.0	4.0	4.0	4.0	4.0
Albania	2.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Yugoslavia	—	3.2	3.2	3.0	3.0	3.0	3.0	3.0
Algeria	—	—	0.8	1.2	1.9	2.5	2.8	2.1
Czechoslovakia	0.2	1.9	2.5	2.5	2.5	2.5	2.5	2.5
French Morocco	—	1.6	2.1	2.0	2.1	2.1	2.1	2.1
Italy	0.2	0.4	1.3	1.8	1.9	2.0	2.0	1.9
United Kingdom	0.1	0.9	1.1	1.1	1.1	1.1	1.1	1.1
Total (Excluding USSR)	170.6	214.9	226.6	238.7	247.9	256.7	259.0	250.6
USSR	630.0	842.0	940.0	1,020.0	1,035.0	1,045.0	1,060.0	1,040.0
Total	773.6	1,056.9	1,166.6	1,258.7	1,282.9	1,301.7	1,319.0	1,290.6
Near & Middle East								
Kuwait	—	563.0	752.4	794.2	887.7	850.6	907.5	860.0
Saudi Arabia	10.8	761.5	822.5	792.5	878.9	867.4	841.2	845.0
Iraq	84.5	174.6	383.4	543.6	577.8	593.3	585.0	574.9
Qatar	—	49.6	68.4	78.8	90.9	95.5	90.0	88.7
Egypt	12.8	44.7	45.0	46.3	46.7	46.7	46.7	46.7
Bahrain	20.8	30.0	30.1	30.0	30.1	30.1	30.0	30.0
Iran	214.0	350.0	27.5	23.8	26.9	25.0	25.0	25.2
Turkey	—	0.4	0.4	0.6	0.4	0.6	0.6	0.6
Total	342.9	1,973.8	2,129.7	2,309.3	2,539.4	2,509.2	2,526.0	2,471.1
Far East & Oceania								
Indonesia	170.0	151.7	170.9	196.3	207.0	207.6	198.9	202.4
British Borneo	20.0	103.0	104.5	101.1	98.3	101.1	101.1	100.6
India	—	5.3	5.5	6.0	6.0	7.0	7.0	6.5
Japan	7.3	6.4	5.8	5.7	5.3	5.9	6.0	5.7
New Guinea	—	4.8	4.7	4.9	4.7	4.8	4.8	4.8
Pakistan	28.0*	3.6	4.1	4.4	4.4	4.4	4.4	4.4
Burma	—	2.2	2.3	2.5	2.5	2.5	2.5	2.5
China	—	2.0	2.0	2.5	2.5	2.5	2.5	2.5
Total	225.3	279.0	299.8	323.4	330.7	335.8	327.2	329.2
EASTERN HEMISPHERE	1,341.8	3,309.7	3,596.1	3,690.4	4,153.0	4,146.7	4,172.2	4,090.9
WORLD TOTAL	5,769.2	11,790.3	12,336.7	12,869.4	13,072.9	13,195.9	12,973.5	13,028.2

*India and Burma included.

Natural gasoline and condensate production rose 11.5 percent, about 69,000 b/d. United States produced 49.5 percent of the world's crude in 1953 and 81.5 percent of natural gas liquids compared with 51 percent of crude and 82 percent of condensate in 1952. North American production of crude was 52.6 percent of the entire world compared with 54 percent in 1952.

Among the larger producing nations of South America, Colombia, Argentina and Trinidad all produced more oil in 1953 than the previous year. Venezuela output was reduced 43,100 b/d to 1,760,800 b/d largely because of a loss in shipments to Europe. Venezuela produced 13.5 percent of the world's oil compared with 14.6 percent in 1952. Drilling operations in the first half of this year were higher, but activity was curtailed slightly in the final months. At the close of the year, Venezuela had a surplus producing capacity of about 160,000 barrels daily compared with about 1,300,000 b/d in the United States and about 2,300,000 b/d in the nations outside the Soviet sphere of influence and excluding Iran. If the potential output of Iran is added, the shut-in volume swells to about three million barrels.

Passage of the new oil law in Peru stimulated renewed interest in the oil possibilities of that country. During the year exploration concessions were granted covering 4,593,000 hectares. Geological and geophysical work is being undertaken over much of this territory.

On November 26, 1953 Douglas Oil Co. of Los Angeles spudded its first offshore well in Lobitos Bay, some 10 miles north of Talara on the northern coast of Peru. Inclined drilling from the shore into the ocean will be applied for the first time in western South America. It was introduced recently on Lake Maracaibo in Venezuela and in Trinidad. Douglas proposes to drill the first wells to a distance of a quarter mile into the sea to a depth of around 4,200 feet. In a second stage, drilling will be continued to half a mile into the ocean and to about 7,000 feet depth. Water depth is about 30 to 60 feet. Cost of the first well is estimated at about $125,000 to be completed in 60 days.

Douglas has agreed recently with Compania Petrolera Lobitos to develop a strip of sea around 1,000 acres, included in the concession of Lobitos Co. An operating agreement has been concluded also with Cia. Petrolera del Pacifico, a new national company, which has applied for around 100,000 acres of offshore concessions on the continental shelf of northern Peru.

A more relaxed attitude toward foreign oil companies in Argentina has been predicted recently as leaders considered means of reducing the cost of imported crude. YPF has found some new oil, but the domestic volume still is far from meeting requirements.

Bolivia also has felt the need of foreign capital and technological assistance in finding new oil. As a result, Glenn McCarthy of Houston has organized a company to prospect an area of 970,000 acres in the Gran Chaco. One rotary rig was shipped to Bolivia recently and additional equipment capable of drilling to 10,000 feet must be forwarded before May 26, 1954. McCarthy has an initial period of 2½ years for exploration after which exploitation is to be undertaken on an accelerated basis. Term of the lease is 35 years.

Brazil, the other large importer of foreign oil in South America, has taken an opposite view in its new oil law adopted after extended debate. Oil production is retained as a state enterprise.

In Europe there has been a steady rise in West Germany's crude production through the year. October output averaged 45,000 b/d, double the production of the country three years previously. In the first nine months of 1953 drilling in Germany totaled 1,328,820 feet. A total of more than 300 miles for the year was forecast.

The USSR has announced a production of 1,040,000 barrels per day of crude in 1953, an increase of 9.5 percent over the previous year.

In a recent speech Romanian Prime Minister G. Gheorghin-Dej announced that crude production at the end of 1953 would reach 186,000 barrels daily and that the 1955 goal of 200,000 barrels daily is in sight. Importance of the new Pitesti field was stressed. The figures astonished most western observers who have tended to discount previous reports of rising output.

Australia became the last continent to join the ranks of oil producers in 1953. After years of unsuccessful exploration in eastern states, the first well drilled on the west coast found oil at 3,600 feet. A day's test produced at the rate of 23 barrels per hour. The find was not fully evaluated at the year end.

U. S. PETROLEUM SUPPLY AND DEMAND

(Daily Averages in Thousands of Barrels)

	1941	1951	1952	1953[1]
Supply				
Crude Petroleum	3,841	6,158	6,262	6,487
Natural Gasoline & Other Supplies	230	562	597	666
Imports, all oil	265	844	958	1,044
Total	4,336	7,564	7,826	8,197
Demand				
Domestic Demand	4,071	7,043	7,281	7,721
Exports, all oil	300	424	436	386
Total	4,371	7,467	7,717	8,017
Refinery Crude Runs	3,860	6,494	6,688	7,014
Total Stocks	556,000	615,393	673,754	707,000

[1] Preliminary, subject to revision

Four new fields and an important field extension were discovered in the Persian Gulf Area. In the Kuwait-Saudi Arabia neutral zone, five wells were completed in the Wafra field discovered by a group of American companies and across the line in the Shaikdom of Kuwait the third field in that country was proven. Wafra crude will begin flowing into world markets in 1954.

Basrah Petroleum Co. completed a successful wildcat at Rumaila in southeastern Iraq in November. The well is some 20 miles from the Zubair field and oil was found at 10,000 feet, about the same as the Zubair.

Another Iraq Petroleum Co. associate, Petroleum Development (Trucial Coast) Ltd., is drilling a wildcat in the Shaikhdom of Abu Dhabi which reported a good showing at about 10,000 feet. The well is considered significant in that it is a major extension of the known petroliferous area on the Arabian peninsula.

Arabian American Oil Co. completed late in December what it refers to as a "step-out" at Huiya. The well is 15 miles south of present producing limits of Uthmaniya. The new find proves a productive length of about 100 miles in the Ghawar field or group of fields. It makes a major addition to Middle East known reserves, now calculated by some authorities at 100 billion barrels.

Total output of Iraq fields passed 600,000 barrels per day in September. This was an increase of 227,500 barrels over the 1952 average of 372,500 barrels daily.

Saudi Arabian production in 1953 averaged 845,000 b/d. Production in late months of the year was reduced substantially below the peak of 909,600 b/d reached in July. November withdrawals from the four producing Saudi Arabian fields was down to 811,700 b/d. At the end of the year seven of the 11 proven fields were shut in. Of the 251 wells in the shaikdom, 144 were producing oil, three gas and 104 shut in. Three drilling rigs were running.

Kuwait reported an increase in output of 198,000 b/d to 860,000 b/d in 1953. The increase was 14.4 percent. British influence in Kuwait as well as Iraq and Qatar is important and the urge is strong to produce as much Sterling oil as possible to minimize British dollar requirements.

Middle East production as a whole rose 16 percent in 1953 to 2,471,100 b/d.

As the year closed, there were many indications that Iranian oil will become a market factor before long. The mission of Herbert Hoover, Jr., to Persia followed by the resumption of diplomatic relations between Britain and Iran suggests that an agreement is in the offing. It is not thought that any major portion of the Iranian potential will find a market at once, but it seems clear that some modification of producing schedules in other Middle Eastern fields will become necessary to avoid market indigestion.

New figure

on the petroleum scene

By Joseph Huttlinger

WASHINGTON

FELIX EDGAR WORMSER, 60, a tall, spare man who has spent the bulk of his professional life as a mining consultant, is emerging as the top government official on petroleum and natural gas matters.

He is the Assistant Secretary of Interior for mineral resources. Current plans, due for completion early this year, are to give him authority over oil and gas matters in two ways:

(1) Mr. Wormser would have general supervisory authority over the peacetime Oil and Gas Division, which is shaping up as the successor to the Petroleum Administration for Defense.

(2) Mr. Wormser would have full power to carry out functions over oil and gas set out in the Defense Production Act which continues until next June, unless further extended by Congress.

A paramount function under this act is to oversee the voluntary agreement among American petroleum companies operating abroad; they swap information and pass it on to the Defense Department and other agencies. Without specific authorization, such a practice would violate the anti-trust laws.

Other defense act powers to go to Mr. Wormser cover issuance of directives, use of the services of business executives without compensation, and recommendations of certificates of necessity for new petroleum projects for which fast tax amortization privileges are proposed. At each step, Mr. Wormser would have the advice of the OGD, although that agency would exercise merely advisory authority.

This pattern was first put on paper in December by the National Petroleum Council, composed of about 100 top oil and gas executives. The council reported, in answer to a government request, on the type of industry-government relationship it preferred in the future.

The council itself should continue, the organization suggested, and from time to time additional industry committees should be set up to study "special problems." This suggestion came on top of government plans to ask industry for its ideas on the project of a new super-inch oil pipe line from the Texas Gulf Coast to the Atlantic.

Re-creation of the Military Petroleum Advisory Board, ended three years ago with the coming of the PAD, was asked by the council. Appointment of industry men to the board would be signed by both Interior Secretary Douglas McKay and Secretary of Defense Charles E. Wilson.

Mr. Wormser would have no authority over oil and gas not held by Secretary McKay, but he would be the man actively concerned with oil and gas. Thus, it is to Mr. Wormser that the industry would look for cooperation and to him that it would give advice.

A number of former officials, friends of the industry in government, will be in the setup that is shaping up. Hugh A. Stewart, now head of the eight year old OGD, which is being expanded, is down to continue in his post. Bruce K. Brown, president of Pan-Am Southern Corporation, New Orleans, and A. P. Frame, vice president of Cities Service Oil Co., who have held defense posts with PAD, are being asked to help get the MPAB going again. A number of PAD alumni may be added to the OGD, which is aiming at a professional staff of 20, as against six before the Korean war. At its peak, PAD had a total of 350 persons, including clerical help.

Mr. Wormser, well-liked to date by the petroleum industry, is a personal friend of President Eisenhower, as they were at Columbia University together in recent years. The President was head of the university, while Mr. Wormser was chairman of a committee which raised $13 million for an engineering center.

Mr. Wormser speaks with some awe of the President. "You get to be devoted to the guy," he says. "He is a wonderful personality, a wonderful man. He is full of ideals, and just as decent as can be."

The invitation to Mr. Wormser to "join the team" came at Guam more than a year ago, after the President had been to Korea. A more formal invitation came later, after Mr. Wormser had talked it over with Secretary of the Treasury George Humphrey, Secretary of Interior Douglas McKay, and Sherman Adams, White House adviser.

"Take this pad and pencil and write down what I say," said Secretary Humphrey. "I am leaving my company to join the government, and if they object, I'll tell them to get in touch with George Humphrey." Later he was appointed, confirmed by the Senate, and sworn into office last April.

Mr. Wormser cut loose from St. Joseph's Lead Co., where he had been vice-president since 1947, to join the government and says he has no arrangement to go back, even though he hopes for that. He has spent some time seeking higher tariffs on lead and zinc imports in the past, to protect the company's vast domestic holdings. At times, his words have recalled those of American petroleum producers. "It is a question to decide on how far the American miners should be subjected to competition of that type (imports)," he told the Senate Interior Committee which approved his nomination.

Mr. Wormser was born in Santa Barbara, Calif., took his mining engineering degree from Columbia University in 1916, and worked for small mining companies and the government until 1920 when he joined the editorial staff of McGraw-Hill Publishing Co.

After five years, he set up a New York office as a consultant on mining matters, worked closely with associations, including the Lead Industries Association and the American Mining and Metallurgical Society, of both of which he became president. He joined St. Joseph's in 1947. For three years, until transferring to the government, he was chairman of the Columbia University Engineering Center Development Fund.

May enlarge synthetic rubber capacity

ADVERTISEMENTS have been published recently by the United States Rubber Producing Facilities Disposal Commission inviting bids for the purchase of government-owned synthetic rubber plants. Covered by the invitation are 13 plants manufacturing GR-S, two butyl plants, eight butadiene plants, one styrene plant and one duodecyl mercaptan plant. All of the butadiene plants offered are those using petroleum fractions as raw material.

The possible sale of government plants and future private operation of the synthetic rubber industry has given rise to market studies by a number of companies. These studies indicate that under private operation the synthetic rubber industry soon may enter a period of growth marked by plant expansion, particularly in the manufacture of butadiene from petroleum.

Under private operation it generally is conceded that the butadiene plants based on alcohol could not be operated. During the war it was found that butadiene from alcohol cost about four times as much as from petroleum. While there may have been some change in this ratio, the alcohol plants have never been operated by the government since World War II except in emergencies such as the outbreak of hostilities in Korea.

Estimates of future demand for butadiene suggest that an increase of nearly 10 percent in producing facilities will be necessary within the next one or two years unless alcohol plants are reactivated. Present petroleum butadiene plants have an aggregate annual capacity of 637,000 short tons. Against this it is estimated that 1955 demand will approximate 691,000 tons. A deficiency of about 54,000 tons next year is in prospect.

Much of the growth in demand for butadiene is the result of applications outside the automotive tire field. Included are the oil-resistant rubbers, rubber base paints, resins and nylon. Total of these uses in 1955 has been estimated at 80,000 tons compared with 611,000 tons for GR-S rubber.

Individually the collateral uses of butadiene are not large at this time, but the growth factor is unusually great. Petrochemists believe that other uses will develop which may require a tonnage of substantial proportions in view of the versatility of butadiene as a raw material.

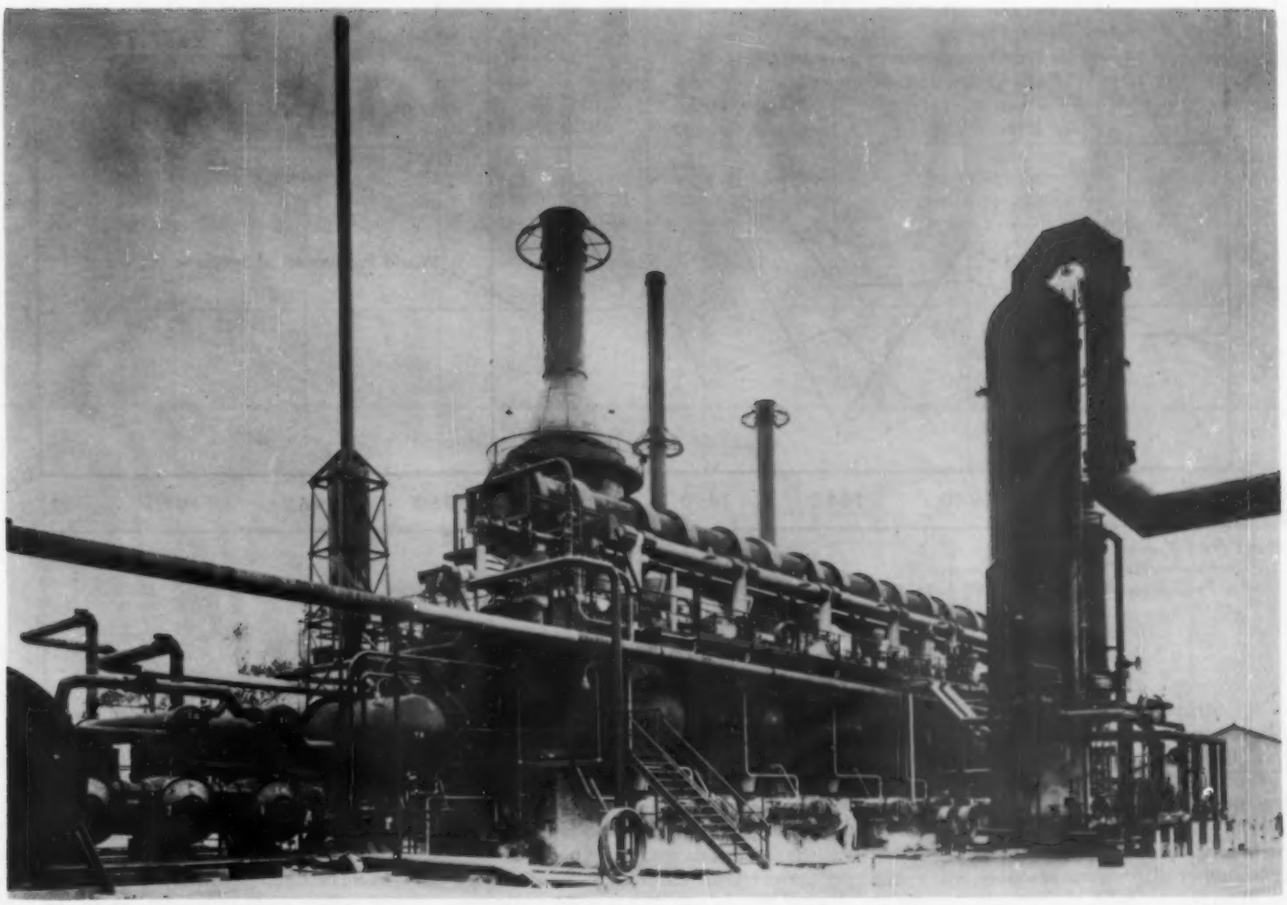
Rubber base paints have had an astonishing growth in the past five years. A latex composed of butadiene and styrene polymers forms one of the chief ingredients of the new paints for interior use. Mixed with water, the rubber base paints are low in odor and so easy to apply that the average householder has little difficulty in turning out a good job. Popularity has been enhanced by the present high labor cost of professional paint jobs.

Synthetic rubbed-based paint was first introduced for general sale in 1948. In 1949 sales totaled two million gallons, in 1950 distribution rose to 3½ million gallons and there was an astonishing rise of almost 1,000 percent in 1951 to 30 million gallons. The 1952 total rose another 33 percent to 40 million gallons. It is estimated that 25 percent of paintable home surfaces now are being covered with latex paint and that the total eventually will rise to 75 percent.

In the fiber field, butadiene has a large potential market as an alternate for other components such as benzene, furfural and cyclohexane, all of which are relatively scarce and expensive.

Butadiene is so reactive that it is finding a wide use for the production of resins when polymerized and combined with styrene and acrylonitrile. Wider uses undoubtedly will be made of the diolefin when it becomes more freely available.

Economic factors undoubtedly will exert a greater effect on synthetic rubber if the industry is denationalized. The tax factor will affect costs and hence the ability of private industry to compete with natural rubber. On the other hand, the government requires prospective synthetic plant buyers to show that the facilities will be operated to produce rubber or rubber components. The buyers must agree to have available for 10 years as much rubber capacity as is purchased. Another factor affecting the competitive situation has been the attitude of natural rubber planters in the post-war period. Low fixed prices for synthetic rubber as well as political uncertainties in some rubber-producing areas have retarded the planting of trees. The seven year lag between tree planting and maturity creates a time-lag



The Houdry dehydrogenation plant at the El Segundo refinery of the Standard Oil Company of California has been in almost continuous operation since going on-stream in January 1944. Built by Defense Plant Corporation, this unit was originally designed for the production of butadiene from butane. Since the war, the unit was shifted to butadiene-butene production.

Shown at the rear of the battery of heat exchangers is the steam jet employed to purge the reactors after catalyst regeneration. Stacks for three heaters are seen above the air inlet header to reactors. One heater handles the butane-butene recycle, one the butane feed while the third is for the stripper. Quench tower is at the right of the battery of reactors.

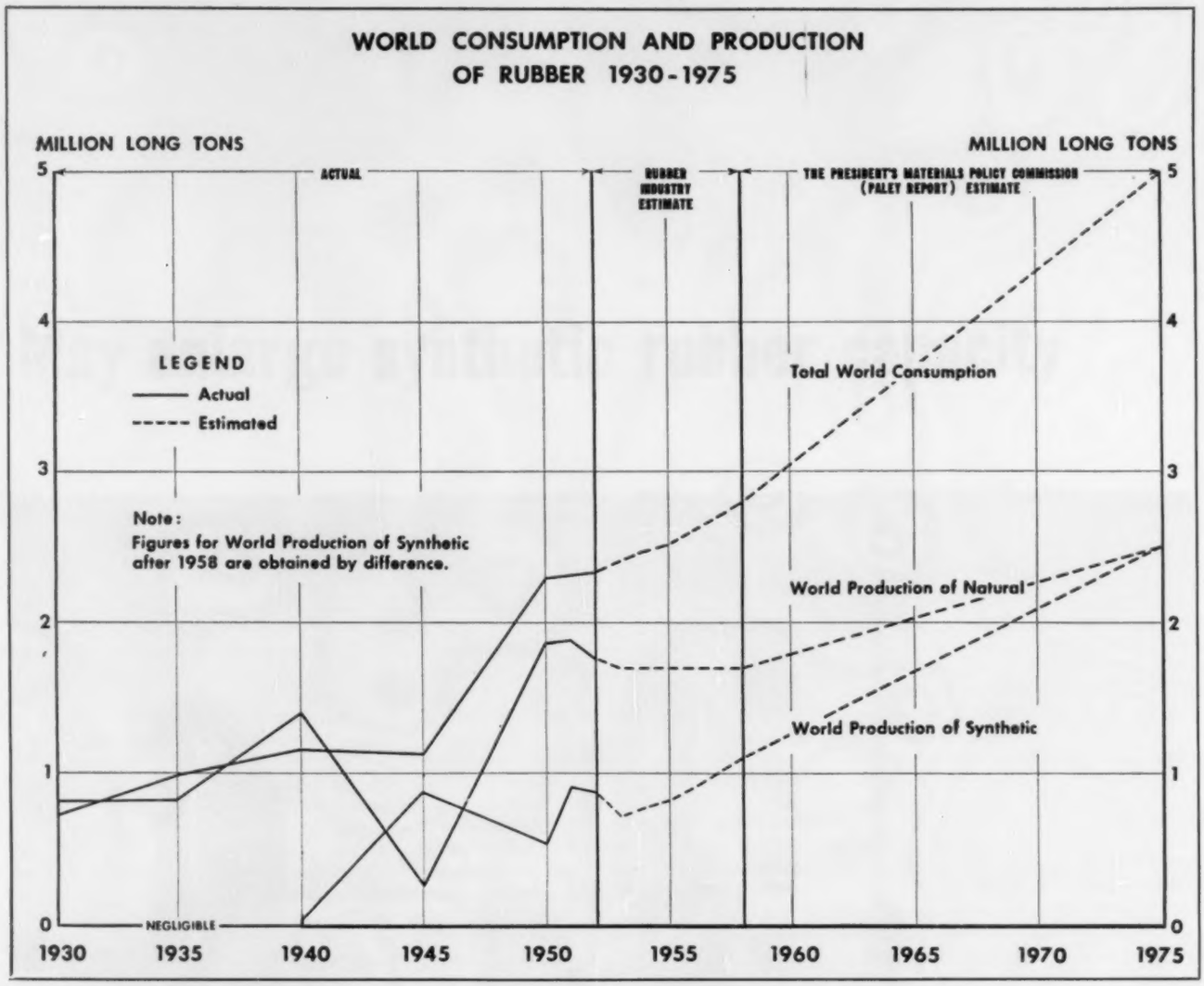


Chart from Reconstruction Finance Corporation booklet "Government-Owned Rubber Producing Facilities," March 1, 1953.

in the natural rubber industry which cannot fail to be of importance in a competitive battle between the two.

Economists familiar with the world rubber situation declare that there will be a shortage by 1960 unless something is done to alleviate the situation. It is suggested that rubber plantations probably will not be enlarged to meet the growth in consumption for a variety of reasons, one being the ability of synthetic manufacturers to produce rubber at a price which does not make rubber growing attractive.

During the past two years natural rubber producers have been seeking a larger share of the American market by progressive price reductions. In December 1952 the price of natural rubber was 34 cents per pound in New York. This compares with the fixed government price for synthetic rubber of 23 cents which has been in effect since March 1952. In 1953 the price of natural rubber declined steadily, reaching 21½ cents at the end of November.

The decline in price has had the effect of giving natural rubber a larger share in the American market. In the first 10 months of 1953, natural rubber use in the United States rose 27.3 percent while synthetic consumption rose only 1.3 percent. By October, with natural prices lower than synthetic, 44.4 percent of the rubber market was supplied by the natural product, compared with 36 percent in 1952.

Natural rubber made a sharp come-back after World War II, jumping from 27 percent of the American market in 1946 to 58 percent in 1948. With the outbreak of hostilities in Korea, the natural rubber market rose sharply from a low of 18 cents to a high of 89 cents in 1950. The price rise reversed the trend toward lower synthetic production. Consumption of synthetic rose 41 percent in 1951 and the price of natural started a slide which has been continuous since that time.

It is the contention of some that a return to private hands of the synthetic rubber industry will stimulate research and reduce costs to a point where the nation can develop an industry capable of supplying emergency as well as normal demand.

In an address some months ago before the Philadelphia Patent Law Association, Roy C. Hackley, vice president of Houdry Process Corp., stated that research in synthetic rubber has been stagnant under government operation since the war. The royalty rate on butadiene of ⅛ cent per pound has not been large enough to act as an incentive in improving processes.

Citing the case of his own company, Mr. Hackley said that Houdry spent $800,000 early in the war to develop a process and thus far has recovered only $85,000 net on this investment. He said that under private operation research will be stepped up and butadiene production costs reduced.

Prior to World War II a great deal of research was carried out by oil and chemical companies, notably by du Pont, Dow and The Standard Oil Development Co., research affiliate of Esso Standard, and Phillips Petroleum Co. in conjunction with Goodrich Rubber Co. Result of this research was the development of special oil-resistant rubbers such as hycar and neoprene and of butyl rubber with special qualities for inner tubes. With the entry of the United States into the war, emphasis was placed on GR-S rubber because of its value for automotive tire casings. This rubber contains about 75 percent butadiene, so that a huge demand was created almost overnight. Alcohol was used as a raw material for more than half of the butadiene early in the war when avgas requirements for butenes were paramount. After 1948, however, the proportion of alcohol-based butadiene fell rapidly and disappeared in the post-war period.

During the war most of the plants were built to produce butadiene from butenes derived from cracking still gases. Phillips produced butadiene in a two-step process involving the cracking of normal butane and the subsequent dehydrogenation of butenes. Houdry came forward with a single-step dehydrogenation process to produce butadiene direct from normal butane or butane-butene mixtures. Butenes also could be produced for alkylation purposes if desired.

The Houdry process reached the commercial stage somewhat later than others and was installed at only two plants. Sun Oil Co. converted existing equipment at its Toledo, Ohio refinery to manufacture 15,000 tons of butadiene per year. This plant was dismantled at the close of the war. Defense Plant Corporation built the only new unit specifically designed to use the Houdry process at the El Segundo, Calif., refinery of Standard Oil Co. of California. This unit went on stream in January 1944. Since the close of the war it has been operating to produce both butadiene and butene. Design capacity was 15,000 tons per year, but actual output has been in the vicinity of 18,000 tons per year.

Houdry recently has been encouraged by the growth of butadiene demand and the probable future shortage to offer its process to interested manufacturers. Since wartime secrecy restrictions have been lifted, Houdry has prepared a description of the process. It is revealed to be a fixed bed, cyclic "adiabatic" process in which the heat of reaction is supplied almost entirely by the burning of coke on the catalyst during the short regeneration cycle.

The desired heat capacity of the catalyst bed is obtained by mixing a catalytically inert material of high heat capacity with the active pelleted catalyst. The inert material acts as a heat-storage medium, absorbing the heat liberated by the combustion of the coke deposit during the regeneration cycle, with a consequent increase in temperature of the bed. The heat is released to the reacting hydrocarbons during the dehydrogenation period, with decreasing temperature. The alumina possesses a very large surface and the heat exchange between this material, the catalyst pellets, and the reactants takes place with very small temperature differences.

The preferred condition is that the heat of reaction but slightly greater than the heat of combustion. The heat deficiency and the desired operating temperature are controlled by the adjustment of reactant and air temperatures, and by the use in

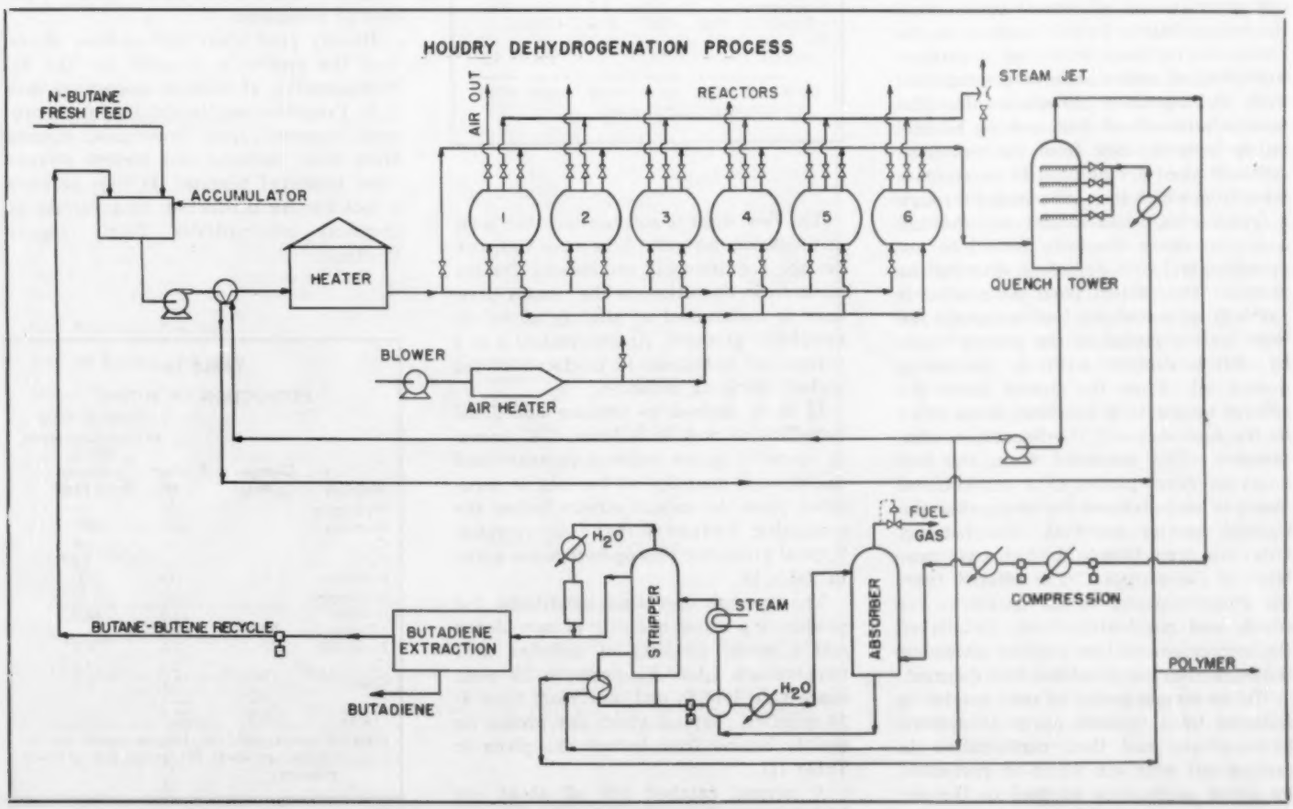


TABLE I

PRODUCTION OF BUTADIENE

	Fresh Feed % Wt.	Recycle % Wt.	Total Feed % Wt.	Reactor Product % Wt.	Ult. Yield % Wt. Butane Fresh Feed
Hydrogen				1.9	10.1
Methane				1.0	5.3
C_2				1.1	5.9
C_3				1.1	5.9
Isobutane	0.5	(1)	(1)	(1)	
Isobutene		(1)	(1)	(1)	
n-Butene		41.4	33.6	33.6	
n-Butane	99.5	57.9	65.8	47.0	
Butadiene		0.7	0.6	11.1	55.8
C_{5+}				0.5	2.7
Coke				2.7	14.3
Total	100.0	100.0	100.0	100.0	100.0

(1) Included in n-C_4 fractions.

the regeneration cycle of an amount of air substantially greater than the combustion requirements. The air used being near atmospheric pressure, the cost of pumping is nominal and the sensible heat in the regeneration flue gases can be recovered in waste-heat boilers.

The on-stream periods are very short, between seven and 15 minutes. The temperature variation during the cycle is usually less than 50° F. The total coke deposited on the catalyst is limited to a low value to insure high catalyst activity throughout the cycle.

The dehydrogenation of butane and butane-butene mixtures to produce butadiene is accomplished by passing the fresh feed, consisting mainly of normal butane, and the butane-butene recycle stock from the butadiene - recovery unit over a catalyst consisting of active alumina impregnated with 18-20 percent chromic oxide. The normal butane fresh feed and the butane-butene recycle stock from the butadiene recovery plant are pumped to an accumulator from which they are pumped through a feed-quench oil exchanger and through a heater where they are heated to approximately 1,150° F. before entering the reactor. The effluent from the reactor is partially quenched in a line exchanger and then further cooled in the quench tower by direct contact with a circulating quench oil. From the quench tower the effluent passes to a knockout drum prior to the first stage of the four-stage compressors. The overhead from the last knockout drum passes to a conventional absorber and stripper for recovering the C_4 and heavier material. The bottoms from this drum pass to the reflux accumulator of the stripper. The effluent from the stripper passes to the butadiene recovery and purification unit. Details of the compressor section are not shown in the accompanying simplified flow diagram.

The on-stream period of each reactor is followed by a vacuum purge to remove hydrocarbons and then regeneration is carried out with air which is preheated by direct combustion of fuel in the air stream. At the end of the regeneration period the reactor is purged by means of a steam ejector prior to the following on-stream period. Thus, in a three-reactor group, one reactor receives hydrocarbons while the second receives air and the third undergoes valve changes and purging operations.

The major process variables are temperature, pressure, space rate, and time on stream. For butadiene operations, average temperature is 1,125° F., pressure is five inches Hg Abs., space rate is 1.0-1.5 volume feed per volume catalyst per hour, and time on stream is 8-10 minutes.

Typical yields for producing butadiene are given in Table I.

For the production of butenes and isobutene from the corresponding normal and isobutane, the reaction is conducted at atmospheric or slightly higher pressures and the space rate adjusted to balance the coke formation with the necessary heat of reaction.

TABLE II

PRODUCTION OF BUTENE AND BUTADIENE

	Fresh Feed % Wt.	Recycle % Wt.	Total Feed % Wt.	Reactor Product % Wt.	Ult. Yield % Wt. Butane Fresh Feed
Hydrogen				2.1	7.4
Methane				1.4	4.9
C_2				1.5	5.3
C_3				1.6	5.6
i-Butane	0.5	(1)	(1)	(1)	
i-Butene		(1)	(1)	(1)	
n-Butenes		35.6	25.5	34.9	33.1
Butadiene		0.7	0.5	9.8	32.7
n-Butane	99.5	63.7	74.0	45.6	
C_{5+}				0.5	1.8
Coke				2.6	9.2
Total	100.0	100.0	100.0	100.0	100.0

(1) Included in n-C_4 fraction.

The flow sheet is substantially the same as the butadiene unit. Line sizes and compressor requirements are smaller for the mono-olefin operation, as the reactor pressure is maintained at slightly above atmospheric pressure. Approximately 1 to 2 percent of butadiene is produced at the higher operating pressure.

If it is desired to produce additional butadiene as well as butenes, the process is operated under reduced pressure and the desired quantity of butenes is separated from the recycle stream before the remaining butane-butene is recycled. Typical yields for this operation are given in Table II.

The normal operating conditions for producing a major quantity of mon-olefins and a minor quantity of diolefins are: temperature 1,125° F., pressure 10 psig, space rate 1.5-2.0, and on-stream time 8-10 minutes. Typical yields for producing mainly butene from butane are given in Table III.

A normal catalyst life of about six months has been experienced in commercial operations. Studies have shown that catalyst contamination with iron oxide should be avoided to prevent excessive gas and coke formation and deterioration of catalyst. For this reason reactors are lined with ceramic tile. Sulfur compounds tend to decrease coke formation and suppress dehydrogenation.

High temperature and low partial pressures are required for maximum production of diolefins. As pressures are built up, yields of butene increase and those of butadiene decrease.

It is important to have an efficient extraction of butadiene from recycle stock because 50 percent of the butadiene recycled is destroyed. Plant experience shows that 11.0 to 11.5 percent butadiene can be produced per pass, using normal butane as charging stock and recycling a butane - butene mixture from which the butadiene has been extracted. Higher butene content in the recycle stock increases the butadiene yield.

Investment cost in a Houdry dehydrogenation plant will vary with size from around $350 per thousand tons annual butadiene capacity for a small unit to about $230 per thousand tons annual capacity for a large unit.

Cost of normal butane to the refiner will have an important bearing on the cost of finished butadiene. With a plant value of 5.5 cents per gallon, the butadiene cost at a moderate - sized plant will be about 10 cents per pound. Each increase of one cent per gallon in the price of butane will cause a rise of 0.39 cent in the cost of butadiene.

Houdry pilot plant studies have shown that the process is feasible for the dehydrogenation of other hydrocarbons than C_4S. Propylene may be obtained from propane, isoprene from isopentane, styrene from ethyl benzene and methyl styrene from isopropyl benzene. It thus becomes a tool for the production of a variety of chemical intermediates from refinery fractions.

TABLE III

PRODUCTION OF BUTENE

Material	Charge % Wt.	Product % Wt.	Ultimate Yield at High Conversion Wt. % n-Butane Fresh Feed
Hydrogen		1.6	3.4
Methane		2.4	5.1
C_2		2.7	5.8
C_3		3.4	7.2
Isobutane	0.5	0.3	Tr
Isobutene		0.2	Tr
n-Butene		32.0	68.2
n-Butane	99.5	52.6	
Butadiene		2.0	4.3
C_{5+}		0.6	1.3
Coke		2.2	4.7
Total	100.0	100.0	100.0

Note: Ultimate yield of butene would be increased at lower conversion and at lower pressure.

Rubber plant disposal faces time-consuming program

LIST OF SYNTHETIC RUBBER FACILITIES

(Dollar amounts are in thousands)

Present Operator	Location	Cost[1] at Dec. 31, 1952	Net Book Value at Dec. 31, 1952	Maximum Annual Capacity (long tons)
Copolymer Plants (GR-S)				
Copolymer Corp.	Baton Rouge, La.	$ 9,276	$ 4,148	49,000
Firestone T. & R. Co.	Akron, Ohio	7,630	3,041	30,000
Do	Lake Charles, La.	15,846	7,697	99,600
General T. & R. Co.	Baytown, Texas	9,983	5,404	44,000
B. F. Goodrich Co.	Port Neches, Texas	21,664	9,694	90,000
Do	Institute, W. Va.	18,387	7,471	122,000
Goodyear Synthetic Rubber Corp.	Akron, Ohio	8,186	3,550	15,200
Do	Houston, Texas	15,246	7,242	99,600
Ky. Syn. Rubber Corp.	Louisville, Ky.	8,932	4,298	44,000
Midland Rubber Co.	Los Angeles, Calif.	15,822	7,759	89,000
Phillips Chem. Co.	Borger, Texas	10,438	4,664	66,000
U. S. Rubber Co.	Naugatuck, Conn.	10,123	4,078	22,200
Do	Port Neches, Texas	14,326	7,277	89,400
Total Copolymer		$165,859	$ 76,323	860,000
Butyl Plants (GR-I)				
Humble O. & R. Co.	Baytown, Texas	$ 24,690	$ 8,226	43,000
Esso Std. Oil Co.	Baton Rouge, La.	28,491	9,378	47,000
Total Butyl		$ 53,181	$ 17,604	90,000
Butadiene Plants—Alcohol				(short tons)
Union Carbide & Carbon Corp.	Louisville, Ky.	$ 31,289	$ 9,455	87,000
Koppers Co., Inc.	Kobuta, Pa.	45,553[2]	12,676[2]	128,000
Total Butadiene—Alcohol		$ 76,842	$ 22,131	215,000
Butadiene Plants—Petroleum				
Cities Service Ref. Corp.	Lake Charles, La.	$ 17,703	$ 3,704	60,000
Copolymer Corp.	Baton Rouge, La.	7,711	1,470	23,000
Humble O. & R. Co.	Baytown, Texas	18,772	3,899	49,000
Neches Butane Prod. Co.	Port Neches, Texas	58,357	12,028	197,000
Phillips Chem. Co.	Borger, Texas	42,239	11,676	71,200
Sinclair Rubber, Inc.	Houston, Texas	31,547	8,258	78,000
Shell Chem. Corp.	Los Angeles, Calif.	20,281	4,061	61,000[3]
Std. Oil Co. of Calif.	El Segundo, Calif.	7,862	1,159	[3]
Total Butadiene—Petroleum		$204,472	$ 46,255	539,200
Total All Butadiene Plants		$281,314	$ 68,386	754,200
Styrene Plants				
Dow Chem. Co.	Los Angeles, Calif.	$ 15,131	$ 4,199	57,000
Other Facilities				
Univ. of Akron	Akron, Ohio	$ 2,144	$ 811	
Davison Chem. Co.	Baltimore, Md.	332[2]	109	
U. S. Rubber Co.	Naugatuck, Conn.	386	158	
Total Other Facilities		$ 2,862	$ 1,078	
GRAND TOTAL[4]		$518,347	$167,590	

NOTES

[1] Original construction cost plus additions (including construction in progress at December 31, 1952) less retirements.

[2] Includes facilities costing $22,223,000 with a net book value of $8,148,000 leased by RFC to Koppers Company, Inc.

[3] Represent a tandem operation whereby Standard Oil Co. of California's production of crude butadiene is transferred to Shell Chemical Corp. for purification along with Shell's crude production.

[4] The above list of facilities does not include butadiene tank cars, tire test fleet and equipment, butylene concentrating facilities, property in excess of operating requirements and Plancor 1166, a calcium carbide plant, located at Ashtabula, Ohio, returned by the lessee to RFC as of 12/31/52. The net book value of the foregoing totals $5 million.

SALE OF THE GOVERNMENT'S half-billion dollar, wartime-built synthetic rubber industry faces such numerous legal hurdles that there is some uncertainty as to when or whether the sales can be carried through.

The uncertainty has little to do with whether more synthetic rubber capacity will be needed and added in the future to meet needs. The government, like private industry, can expand capacity and presumably would do so.

Under the terms of the "Rubber Producing Facilities Disposal Act of 1953," the steps toward disposal will take at least a year and a half before they can be consummated. A series of legal requirements about advertising for bids, fair prices for the plants and negotiations with buyers, designed to prevent one or a few companies' obtaining a near-monopoly of the industry, are set out in that act.

Once the three-man disposal commission has recommended sales, either the House or the Senate may veto one or all of the planned transactions and the Attorney General of the United States may recommend against them.

If and when a sale recommended by the disposal commission is vetoed, all bidders are given a chance to withdraw their bids. In the event that the firm plans of disposal do not cover a certain minimum of synthetic rubber plant capacity, something more than half of capacity, the whole disposal program automatically is disapproved in its entirety and the government continues to own the plants. The minimum is 500,000 long tons of general-purpose synthetic rubber and at least 43,000 long tons of butyl each year.

Present operators of the plants, including petroleum, rubber and chemical companies, are expected to be among the bidders.

Members of the commission on disposal include Holman D. Pettibone, board chairman, Chicago Title and Trust Co., chairman; Everett R. Cook, president, Cook & Co., Memphis, Tenn.; and Leslie R. Rounds, retired first vice-president, Federal Reserve Bank of New York.

A rough timetable of events in the disposal program can be prepared after a study of the provisions of the disposal act itself. Thus:

On November 27, 1953, the three-man disposal commission said it was ready to

receive bids for one or more plants. A minimum six-month period for receipt of bids was specified.

May 28, 1954: negotiations to open between commission and bidders about price, terms, arrangements to supply small business with rubber, and other details. A minimum of seven months for negotiations is provided.

December 28, 1954: negotiations close.

December 29, 1954: commission begins drafting report to Congress. The report must be submitted within 30 days after close of negotiations.

January 29, 1955: commission reports to Congress. Actual deadline in the law is "in no event" later than January 31, 1955. House and Senate have 60 days concurrently to reject any or all sales.

March 29, 1955: last day for Congress to act.

April 29, 1955: last day for successful bidders to reject contracts on the basis of any other sales disapproved by either House or Senate.

May 29, 1955: last day of period for transfer of plants from government to private industry. The deadline is no more than 60 days after last day for Congress to act.

The instructions to bidders set out a series of details of what is required in the bids. They are to be submitted in quadruplicate and must identify the prospective purchaser and any and all affiliates and associations, the order of preference if the bidder offers to buy more than one facility, arrangements (if any), for a supply of feedstock, plans for sales of end products (including provisions, if any, to sell them to small business), a national security clause setting out minimum capacity the plant will be held at for synthetic rubber in case of need for national defense and government recapture for war requirements, claims (if any) of the bidder for patents or royalties, the price offered, a deposit in cash or U. S. government bonds equal to 2.5 percent of the gross amount to be paid but not over $250,000 for each plant bidder wants to buy, and a brief about the effect of the transaction upon small business, upon concentration of synthetic rubber into hands of a few companies, whether the price is fair and other matters.

Committee hearing on oil imports

AS A CURTAIN RAISER to the 1954 battle over oil imports to the United States, a Senate sub-committee of which Senator George W. Malone of Nevada is chairman held week-long hearings in Washington during December. Testimony presented was divided along lines made familiar by previous hearings. Senator Malone's objective, as he has repeatedly stated, is to put an end to the Reciprocal Trade Agreements act at the expiration date now set, which is June 30, 1954. That would automatically restore the high rates of previous tariff laws including an increase in the petroleum duties which would act as a heavy curb on oil imports.

On the petroleum phase of the import debate Secretary McKay and four of his aides testified that the United States oil industry is strong and healthy, with a record number of 47,000 oil wells drilled in 1953, that prices are the highest in recent years and that production is at or near an all-time high.

With him were Joseph A. LaFortune, deputy Petroleum Administrator for Defense; Elihu Madison, head of the program division of the Petroleum Administration for Defense; and Hugh A. Stewart, director of the Oil and Gas Division.

"As long as you maintain an adequate price, like the one we have now, you will have the incentive to find the oil we need," Mr. LaFortune said.

Mr. Stewart thought warm weather and high stocks brought the cutbacks in production. Imports were "a minor factor," is his opinion.

Mr. Madison forecast crude oil imports to the United States for 1953-54 at 650,000 barrels daily, rising to 670,000 in 1955 and 690,000 in 1956.

He estimated domestic crude production for the same period as, 1953, 6,447,000 barrels daily; 1954, 6,600,000; 1955, 6,800,000; and 1956, 6,976,000. On this basis crude imports would remain at about 10 percent of domestic output.

Among representatives of some of the larger oil companies who appeared, L. F. McCollum, president of Continental Oil Co., wanted an "impartial study" to get the facts as to the effect of imports, but stated that personally he thought they were on the high side. J. W. Foley, vice president of The Texas Co., commented that the oil industry is in a sound condition as matters stand.

Sidney A. Swensrud, chairman of Gulf Oil Corp., said, "From a standpoint of self interest, our company has no desire to increase its imports to any point that would endanger our heavy domestic interests."

H. G. Burks, Jr., Esso Standard Oil Co., thought foreign oil would be essential in time of war and should be encouraged.

Advocating restriction of imports were Russell B. Brown, counsel of the Independent Petroleum Association of America; M. D. Bryant, president of the Texas Independent Producers and Royalty Owners Association; John B. Hussey, Commissioner of Conservation of Louisiana; A. C. Rubel of the Union Oil Co. of Calif.; J. P. Coleman, president of the National Stripper Well Association, and others.

They pointed out that crude oil production in Texas has been cut back by 400,000 barrels daily during the past few months, and attributed this to oil imports. In other states too, they said, there have been cutbacks.

"In the national interest," said Mr. Brown, "some action must be taken to prevent an excess of petroleum products from entering the country in such amounts as will destroy our domestic industry."

Speaking from the national viewpoint, Brig. Gen. Alfred H. Johnson, chief of petroleum logistics of the Defense department, pronounced the domestic industry in good shape economically. Then he said, "Oil in case of war is a hemispheric problem, and we consider the Western Hemisphere as one unit so far as oil sources are concerned." He cited Venezuela as "one of the best oil sources for war." Middle East oil, he said, would be needed in event of war for our friends abroad, and some would reach the United States.

Reconciliation of conflicting views was offered by Hines H. Baker, president of Humble Oil & Refining Co., the nation's largest crude oil producing company.

He pointed out in a statement that the bulk of the American petroleum industry is on record as favoring imports to supplement, but not supplant domestic production.

Just what that level is has never been stated, he pointed out. In answer he wrote:

"The principal tests for determining whether imports are supplementing domestic production should be:

"(1) Whether imports are in such quantity that domestic reserve production capacity is substantially greater than 1,000,000 barrels daily.

"(2) Whether imports are adjusted downward in response to declining demand, so as to share proportionately with domestic production the cuts required to balance supplies with demand, and so as to avoid preferential treatment of foreign oil at the expense of the domestic industry.

"(3) Whether domestic exploration and development are being retarded or slowed down below the level required to bring forth the new oil necessary to keep pace with increased domestic consumption."

Western Australia wildcat finds producing sands

Start of drilling was marked by a visit from Australian government officials. A. R. G. Hawke, premier of Western Australia, left, and Lionel F. Kelly, state minister for mines, offer W. G. Walkley, managing director of Ampol Petroleum, their best wishes.

The 142-foot derrick near Exmouth Gulf is topped by Australian and American flags.

WEST AUSTRALIAN PETROLEUM Pty. Ltd. has struck oil in what appears to be commercial quantities in Rough Range No. 1, first wildcat drilled in Western Australia by United States and Australian interests. The well flowed 23 barrels per hour of a very waxy crude through a quarter-inch bottom hole choke. The discovery is the first of importance on the continent although much exploratory work has been done in the eastern states over a period of years.

Sand from which the oil flowed was found at 3,605 and 3,620 feet. This is much higher than oil had been anticipated by WAPET geologists. The well will not be put on production at this time, but will continue drilling to explore lower horizons. Programmed depth for the well is 12,000 feet.

The wildcat test was spudded in during September after more than two years of geological and geophysical exploration. Brown Drilling Co. was contractor.

Site of the well is inland from Exmouth Gulf about 700 miles north of Perth, capital of the state of Western Australia.

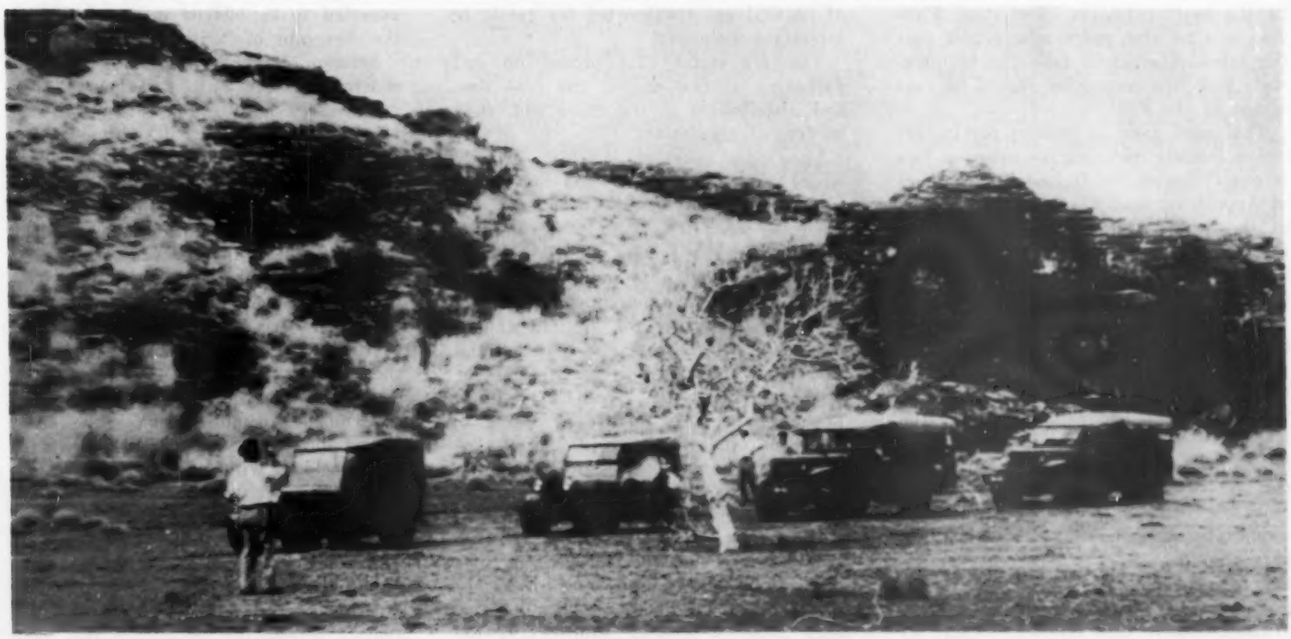
Owners of WAPET are Ampol Petroleum Ltd., an Australian company with a 20 percent interest, and California Texas Oil Co. Ltd. with the remaining 80 percent.

Commenting on the discovery at Canberra, Dr. Harold G. Raggatt, secretary of the National Development Department, said that the sands found productive in Rough Range No. 1 are known to exist over a wide area in Western Australia. Other government officials expressed pleasure because of the possible future savings in foreign exchange.

During the fiscal year which closed June 1953, Australia imported 1,458 million gallons of petroleum products costing £A72 million ($162 million). About £A12 million ($27 million) worth of this was paid for in dollars. Dollars were also paid for considerable quantities of petroleum products from the sterling area because some of the oil companies there have their headquarters in North America.

Drilling for oil is also going on in southwestern Queensland and in the tertory of Papua/New Guinea. The companies engaged in the Papua/New Guinea search recently reported that they had spent more than £A12 million ($27 million) on the enterprise.

Geological caravan which carried the preliminary survey party of WAPET, Caltex affiliate, into the barren limestone hills of the Fitzroy River region, Kimberly Division, Western Australia. This scene is about 750 miles northeast of Exmouth Gulf.



Court ruling makes regulation of natural gas a vital issue

THE WHOLE PATTERN of government regulation of the American natural gas industry in interstate commerce is at a crossroads today.

Involved is the question whether 2,500 natural gas producers, completely independent of long distance gas transmission pipe lines, will come under government regulation of their prices for the first time in the peacetime history of America.

Another issue is whether federal control, presumably directed to lowering prices at the other end of the pipe line, will slow down the hunt for new sources of gas supply, thereby leading to shortages and ultimately to higher prices.

Congress, the courts, the Federal Power Commission, and state governments all are playing roles in the developing drama. Before it comes to a settlement of sorts, a year or more off, heated controversy will erupt. Economic forces on the one hand and political expediency on the other promise to clash.

The immediate cause of today's situation lies in a decision of the Supreme Court on November 30 of last year refusing to review the decision of a lower court in a case involving the Phillips Petroleum Co., Bartlesville, Okla. Thereby the court ruled, in effect, that Phillips is a natural gas company and that the rates at which it sells gas to interstate pipe line companies should be regulated by the FPC.

The court gave no reasons for its decision, merely refusing to upset a two to one ruling of the United States Court of Appeals on May 22, 1953. Some ideas of the court, which are eagerly sought for guidance to future actions, may come in a second gas case before the high tribunal.

This one involves the Northern Natural Gas Co., Omaha, Neb., which has appealed a ruling of the FPC regarding state minimum prices for natural gas. The commission had refused to obey the Kansas state minimum of eight cents, later raised to 11 cents, and ruled instead that Northern's gas is worth about five cents per thousand cubic feet. This decision was based on what was held to be a fair return, about six percent, on the depreciated original cost of Northern's production.

The Northern case offers the court an opportunity to explain its ideas on control of natural gas rates in the field and specifically to referee the collision between state efforts to establish higher prices as a conservation measure, and the fair price goals of the Natural Gas Act which was passed in 1938.

The Northern position is different from that of Phillips. The rates of Northern for years have been subject to FPC control. This is because Northern also operates long distance transmission lines, while Phillips is merely a producer and processor of natural gas.

A third natural gas case before the high tribunal, making a trilogy of vital gas matters, lies in an appeal against a Texas state gathering tax of 9/20 of a cent per thousand cubic feet of gas. The tax, representing a million dollars a month of revenue, is called a burden on interstate commerce by Michigan-Wisconsin Pipe Line Co., Panhandle Eastern Pipe Line Co. and others. The court has agreed to hear arguments. A total of $45 million in tax collection has been impounded awaiting the court decision.

The heart of the Phillips case is this:

The Natural Gas Act of 1938 authorizes the commission to regulate the rates of natural gas transported for resale in interstate commerce.

The act states that production and gathering at one end of the pipe line, and distribution at the other end, shall be free of regulations.

The legal question is this: Exactly where does production and gathering come to an end? At the wellhead? At the lease separating plant? At the natural gasoline or cycling plant? At the point of sale to an interstate pipe line? Or after sale to the pipe line?

Phillips, speaking for all independent gas producers, claims that production and gathering ends at the termination of this chain of events. The FPC agrees. The Department of Justice agrees.

On the other hand, the Court of Appeals held otherwise. The Supreme Court, by refusing to review, virtually agreed with the appeals unit. This tosses the next move to the FPC.

Completely unclear, however, is just where the FPC is to assert control. Only guidance from the courts is in this sentence from the appeals majority: "Thus, Phillips sells the gas after the time and beyond the place at which production and gathering are complete and after processing has intervened." This is vague. From it the appeals unit stepped to this: "Therefore, Phillips is a 'natural gas company' within the meaning of the Natural Gas Act and the Commission should fix the rates at which these sales are made."

The question is, just where does the commission fix the rates?

Until there is an answer from the court, the matter is up to the FPC. And there, the outlook is for a prolonged time before any action. To fix rates, the FPC would have to hold hearings, collect facts and issue an order. That order, too, would be certain to take a trip to the courts for review. Logical place for the FPC to start is with a Phillips cycling plant, according to curbstone opinion.

While the FPC conceivably could interpret the mandate from the high court in a way that would not unduly upset the entire independent gas producing industry, it is by no means certain that it will do so. Therefore sentiment is growing in Congress in favor of early action along the lines of the Kerr bill passed by Congress in 1950, but killed by President Truman's veto.

An earlier attempt at legislation was made in 1947 in the Moore-Rizley bill, which would have barred the FPC from control of field prices of gas both of independent and integrated gas companies. The bill had other provisions and failed of passage. The 1950 bill covering merely field prices of independent gas producers fell under Presidential veto as stated.

A bill identical to the 1950 proposal is before the House Commerce Committee, introduced by Representative John E. Lyle, D., Texas. Other bills may be expected to be offered in January with the convening of Congress.

Senator John W. Bricker, R., Ohio, chairman of the Senate Commerce Committee, says he fully expects bills to be offered to prevent FPC from taking jurisdiction over gas production and gathering.

"I expect the whole subject of natural gas competition in the producing field, including the Phillips Petroleum Co. case, to come before my committee this winter," said Senator Bricker.

Senator Price Daniel, D., Texas, regretted the Supreme Court decision in the Phillips case. "I felt the FPC decision was correct and that the federal government should not have the right to set prices of natural gas produced and processed within the state," he said. "I still think it would be better not only for Texas, but also for all consumers, if producers were permitted to bargain."

A number of industry leaders, foreseeing little chance of the FPC actually exerting control for at least a year, are against attempting legislation this year

lest the subject become involved in politics. They point out that national elections are to be held next November. Paul Kayser, president of the El Paso Natural Gas Co., is reported to feel that the Phillips decision gives the FPC wide power either to take control or not take control over field prices.

The economic phase of the argument turns on the futility of trying to handle an operation as complex as natural gas exploration and production as if it were a public utility. The business is highly competitive, with heavy risks, and is intimately linked with petroleum operations. Some say that one cannot set a price ceiling on natural gas without inevitably affecting the price of crude oil.

An FPC price lid, further, might kill the incentive to find more gas at a time when demand for it is leaping, and thus create a shortage of natural gas for interstate shipment. If so, the eventual end might be higher, and not lower, prices for gas consumers, as no regulation ever devised can abolish the basic law of supply and demand. Purely as a technical matter, it is said an appalling job is ahead in any attempt to set a fair price on natural gas in the field.

Gas-producing states claim a Pandora's box of troubles will follow any attempt by FPC to move into the field to regulate prices. Conservation would suffer, they say. Earlier abandonment of wells and less incentive to find small reserves would come. FPC control might collide too with state minimums, now in vogue in Kansas and Oklahoma. The drive for unit operation of gas fields, proration and ratable taking and the move to pipe casinghead gas to market all would suffer, say the states.

This, then, is the way the Phillips case stands.

The courts have directed the FPC to control some field operations of natural gas producers who are independent of interstate gas pipe lines, but the FPC has latitude as to just how to obey the courts.

The FPC, conceivably, would handle the situation in a way that will not damage the industry or, again, it might reach too far in undertaking control.

The idea of legislation to make clear that the FPC is to keep hands off all phases of production and gathering is being discussed and will certainly reach Congress, but whether or not the legislation will be pushed to conclusion remains to be seen.

Within the industry a majority appears to favor enactment of a bill defining the FPC's authority as soon as possible.

Rex G. Baker, vice-president of Humble Oil & Refining Co., Houston, has this to say on the subject:

"Solution of the problem lies in legislation which should be passed by the Congress. This legislation should be aimed at two things: (1) it should prevent the FPC from fixing or regulating the price at which the producer or gatherer of natural gas sells his gas to a natural gas company, and (2) it should assure the natural gas company of an allowance for gas equal to the actual price paid where the gas is purchased at arm's length from non-affiliates, or the market price or fair and reasonable value in the field if the gas is produced by the company itself or is purchased from an affiliate.

"Legislation of this character is sorely needed in the best interests of all concerned. It will operate to free the production and gathering of gas from the uncertainties and hazards with which they have been surrounded within the past decade.

"It will encourage the risk of venture capital in the search for new gas reserves. It will reestablish a free market for natural gas which, in turn, will assure consumers of abundant supplies at reasonable prices in the years to come."

Record Sale of Offshore Leases

First important sale of offshore concessions to be held since Congress confirmed the title of the states to tidelands areas took place at Austin, state capital of Texas, on December 1. The sale was conducted under direction of the Texas School Land Board which had invited bids on a total area of more than 500,000 acres including waters in bays and inlets as well as in offshore areas of the Gulf of Mexico.

From the viewpoint of the endowment fund for the public schools of Texas, the sale was a tremendous success. More than 1,100 bids totaling upward of $75,000,000 were submitted. Bids accepted covered 375 of the 440 tracts offered for an aggregate area of over 400,000 acres and produced $32,367,819 for the state school system, an average of $78.25 per acre. The largest previous sale was held in 1947 before rights of the coastal states over their coast waters had been challenged. On that occasion gross returns were $12,295,730, or approximately 38 percent of the amount realized for this year's offering.

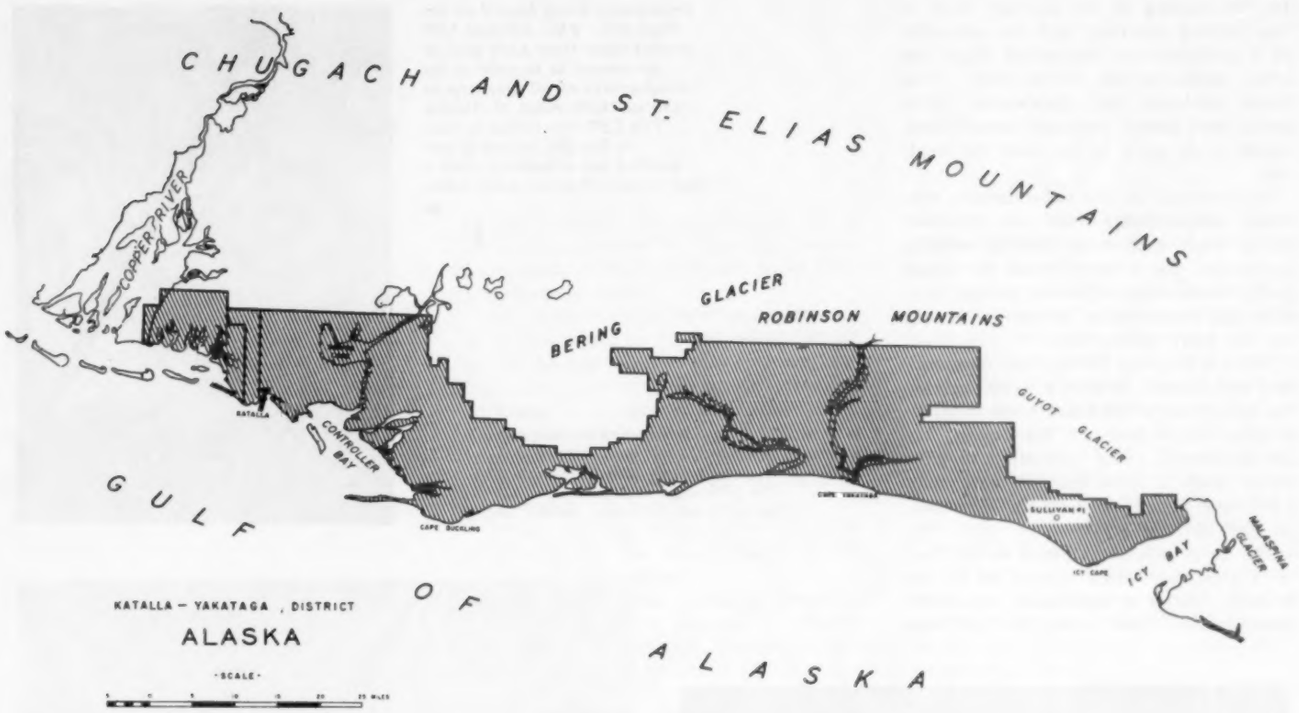
Top figure of the sale was $3,065,880 paid by the Gulf Oil Corporation for a tract of 5,760 acres, upward of $532 per acre, off Neucres County, near Mustang Island. Other areas of equal size brought bids of $2,609,280, $1,923,840 and $1,537,920. Altogether, nine bids were presented in amounts over $1,000,000.

All areas offered by the state were within nine miles of the shore line to make sure they were well within the zone of three leagues (10.35 miles) quitclaimed by Congress to the state. Regions beyond this limit are under jurisdiction of the federal government as part of the continental shelf and the exact line of demarcation has not been established as yet.

State officials were enthusiastic over the interest shown in the sale and the spirited competition to obtain leases. They acknowledge that the result was beyond expectations and regard it as assuring an energetic campaign of exploration and drilling in the Tidelands. The general opinion was expressed by Bascom Giles, state land commissioner, who said, "With these oil companies investing millions of dollars in offshore leases, it is a certainty that they will not hesitate to spend other millions in exploration and drilling. The demonstration we have just seen is unlike anything else that has happened in Texas or, I believe, anywhere else in the world, and it points to the greatest offshore development the state has ever seen."

The first well location of the joint Alaskan venture by Phillips Petroleum Co. and Kerr-McGee Oil Industries, Inc. is at Little River, about 16 miles from Icy Bay. The well location is in the wooded area in about the center of the picture, looking northward along Little River.

Acting as a temporary fuel storage point for the Alaska camp, the LST "Pacific Islander" is beached on the shore of Icy Bay. Tons of glacial ice often choke the entire bay, forming a natural barrier that isolates the area for weeks.



Wildcat drilling begins on Alaska lease

PHILLIPS Petroleum Co. and Kerr-McGee Oil Industries, Inc., will begin drilling operations on their million-acre lease in the Katalla-Yakataga district of Alaska early in January.

Sullivan No. 1, first test to be drilled on the block of some 500 leases, is located at Little River about 16 miles from Icy Bay. The location is near the southern end of the group of leases which cover an area extending nearly 120 miles along the coast.

Kerr-McGee industries is in charge of drilling and Phillips Petroleum will be operator if commercial production is found.

Under agreement with the U. S. Interior Department, 12 exploratory wells are to be drilled over a period of 10 years. Six are to be drilled in each of two districts. Before June 30, 1965 the two companies must spend $1,200,000 for exploratory work. In the remaining portion of the exploration period, expenditures in this category are to be at least 40 cents per acre per year.

Two wildcats must be begun before June 3, 1956, two more in the next two years, and two per year thereafter. Development wells drilled to prove the extent of a discovery will not count toward the mandatory drilling program.

Elaborate preparations for the development of Alaskan oil included the complete assembly of a new drilling rig at the Torrance, Calif., plant of The National Supply Company before shipment in September. Assembly at Torrance was undertaken to assure trouble-free construction and operation without loss of time at a location so far from sources of supplies and engineering services.

Initial preparations for this project began in June 1953, when road building equipment left Seattle and headed for a 4th of July amphibious landing at Carson creek on Icy Bay. This location was selected because it offered the protection of an underwater sand bar about 10 miles south of Guyat Glacier.

A temporary camp was set up by crews arriving by plane and a program of aerial photography and surface geology was begun immediately by a four-man surface geology crew aided by helicopters. Initial operations also included the cutting of a road 38 miles along the coast from Yakataga to the temporary camp on Icy Bay. This required crossing about 40 streams of varying sizes. The only one of them not contaminated by seepage oil will be close to the permanent camp near the half-way point and will provide usable water.

While initial operations were under way in Alaska, drilling equipment was being collected at the Torrance, Calif., plant of The National Supply Company. By September 1 the assembled rig was ready

for the raising of the 133-foot mast to the drilling position, and for assembly of a prefabricated corrugated sheet-iron house enclosing the entire unit. This house enclosed the drawworks, drive group mud pumps and mud manifolding. Steam coils were to be used for heating.

Incorporated in the substructure, separate compartments were also provided for a work shop with electric welding equipment, for a store house for spare parts, the housing of water pumps, auxiliary air compressors, air receivers, etc., and for power generation.

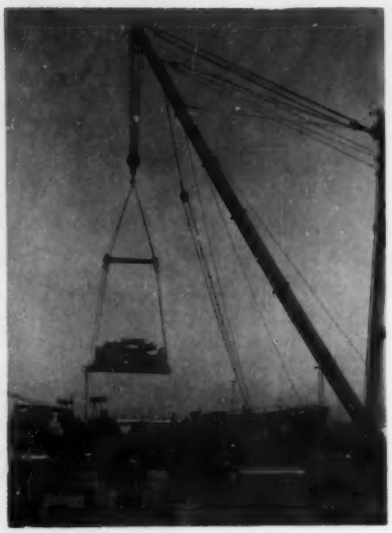
After a test run the rig was disassembled and loaded on trucks which carried the equipment in 20 truck loads to docks at Long Beach harbor. The drilling rig and equipment, along with other supplies which made a total load of more than 1,500 tons, were loaded on the Foss 207, an LST 327 feet long.

The barge was then towed to Icy Bay by a steel tug which served as an ice breaker. After a three-week voyage of approximately 2,000 miles, the LST was beached on the shore where it was met by permanent personnel flown in by plane. The equipment was then trucked to the rig location and the permanent camp site three miles beyond the rig location.

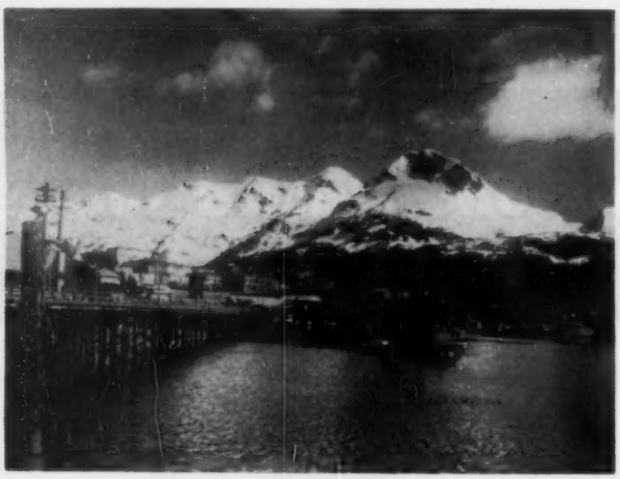
Operations are being supervised by M. C. Womack, general manager, and J. R. Glover, drilling superintendent. Personnel consists of 10 men for two drilling crews, two mechanics, two tractor drivers, a geologist, two cooks, two helpers, a pilot, and chief clerk.

The camp consists of trailers for housing and a well-equipped galley. For recreation, club house facilities are available in a 20 by 40-foot prefabricated house. These include games, radio, phonograph records, moving pictures, and in one section is a library with books, magazines, and newspapers which will be flown in daily, and facilities for letter writing. Daily flights to and from Anchorage will also bring in supplies and handle laundry. Two-way wireless telephone communication is to be maintained with the outside world, from rig to camp and with all mobile units.

Drawworks being loaded on the Foss 297. This 327-foot LST carried more than 1,500 tons of equipment to be used in the development of oil property on the southern coast of Alaska. The LST was towed by tugs to Icy Bay where it was beached for unloading after a 21-day voyage of about 2,000 miles. ►



Two helicopters shuttle men, equipment, and supplies from the exploration camp to points in the Yakataga district where geological work is being carried on. ▼



▲ *Cordova is the anchor link in the Phillips Petroleum Co.-Kerr-McGee Oil Industries, Inc. Alaska supply chain. The only large settlement for hundreds of miles, this picturesque fishing village is located about 200 miles northwest of the present exploration area.*

◄ *In preparation for drilling on the southern coast of Alaska, the National Supply Co. completely assembled the rig at its Torrance, Calif. plant. The rig-up included assembly of a corrugated sheet-iron house enclosing the drawworks, drive group, mud pumps and mud manifolding.*

CANADA'S gas line plans move forward

THE PROSPECT FOR construction of a natural gas pipe line crossing Canada to markets in the east appears to be moving closer to reality.

The Government of Alberta, which controls the reserves of gas which would travel through this line, has held hearings and given a conditional green light.

A meeting is planned for Ottawa early in January when executives of pipe line companies and of both the Alberta and Dominion governments will try to complete plans.

If all goes as expected, the start of construction of an Alberta-Montreal line could come by summer.

A big hurdle was passed in December when Premier E. C. Manning of Alberta announced a conditional approval of two applications as follows:

(1) Trans-Canada Pipe Lines Ltd., a subsidiary of the Canadian Delhi Corp., which plans an 1,800-mile, 30-inch gas line from Alberta to Montreal at a cost of $250 million. The line would have 13 pump stations and a capacity of 346,000 mcf daily. C. W. Murchison is president of the parent company, Delhi Oil Corp.

(2) Western Pipe Lines of Canada, which wants to lay a line from Alberta to Winnipeg, Canada, there to connect with a Winnipeg-Minneapolis line to be constructed by Northern Natural Gas Co., Omaha, Neb.

Premier Manning commented that reserves of gas are sufficient for a combined line to the east, saying there will be five trillion cubic feet available for export by the time any line could get into operation.

"The Government," he said, "believes this can best be accomplished and the interests of the producers, consumers and Canada as a nation best served by Trans-Canada Pipe Lines *et al* and Western Pipe Lines combining into one project the major proposals of their respective applications.

"That is to say, the construction at the earliest date of an all-Canadian pipe line from southern Alberta through Regina and Winnipeg to the markets of Ontario and Quebec with a connecting line running south from Winnipeg to the Minneapolis market areas of the U. S.

"Such a project, properly designed, would meet the requirements of a national program for the large scale development and utilization of Canadian resources by and for the people of Canada and at the same time establish a valuable expandable export market which would substantially improve the economics of the overall project, permitting higher prices to western producers and lower prices to eastern consumers."

The Prime Minister of Canada is in general agreement, and ready to cooperate, the statement added.

The Alberta government still requires proof that the project can be financed, that prices to gas producers will be fair, and that there are firm markets in the east, the Premier said. To receive evidence on these points, the Alberta Petroleum and Natural Gas Conservation Board will meet at an early date, he said.

Once this proof has come, he added, "I am quite certain the board will recommend to the government (of Alberta) that a permit be granted and the provincial government will approve such a recommendation."

Immediate result of the Premier's statement was the calling of the Ottawa meeting. After that, presumably, will come more hearings before the Board. As observers see it, the Premier's statement may be the beginning of the end of the application for permission to lay what may be one of the largest natural gas transmission systems in the world.

The Premier reviewed board findings on gas reserves as follows:

"Alberta's established gas reserves as of June 30, 1953, are placed at 11.5 trillion cubic feet, an increase of 4.7 trillion cubic feet since the board's report of March 1952.

"Alberta may anticipate a further increase in established reserves of from one and one quarter to one and one half trillion cubic feet per year for the next 10 years, provided incentive for development is maintained.

"Alberta's local requirements for the next 30 years are estimated at 4.45 trillion cubic feet, requiring reserves in the amount of 6.4 trillion cubic feet to meet annual and peak day requirements.

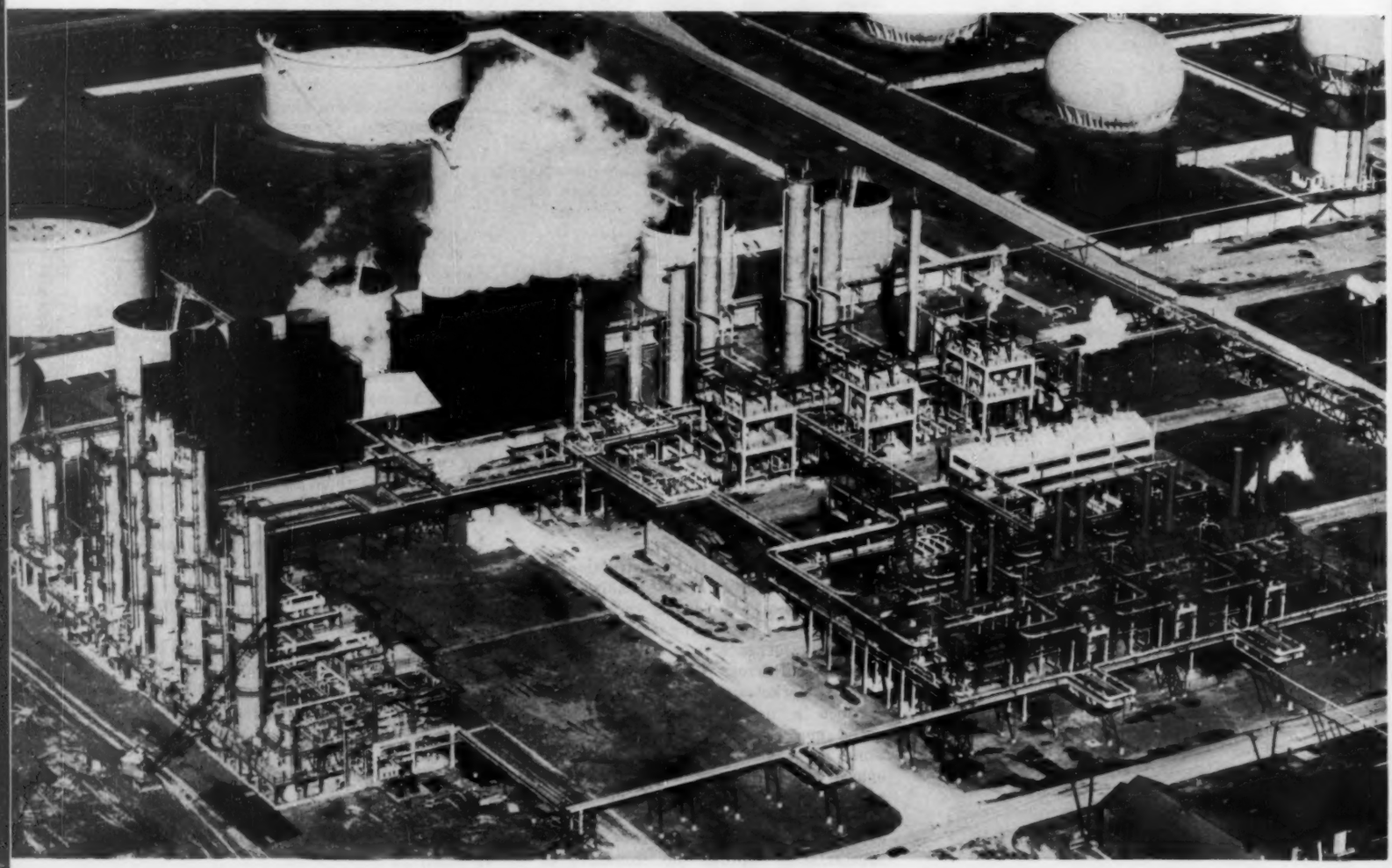
"The board recommends an internal trunk line gathering system under exclusive provincial jurisdiction and control.

"Alberta now has available for eastern export approximately 3.5 trillion cubic feet of deliverable surplus gas and it is anticipated this amount will increase to approximately five trillion cubic feet by the time a pipe line can be completed, provided the incentive necessary to stimulate continued development is maintained."

The Alberta Government "concurs" with these findings of the Board, said the Premier, and considers them to be conservative estimates, if incentives keep up.

AROMATICS RECOVERY PLANT

General view of Sun's new $15,000,000 petrochemical plant at Marcus Hook, Pa. Towers at upper right are for prefractionation of feed stock. The Houdriformer section is in front and to the right. Purification section, involving Udex process and after-superfractionation, is at left.



ACTIVATED BY SUN OIL

FIRST COMMERCIAL installation of the Houdriforming process has been placed on stream at the Marcus Hook, Pa., refinery of Sun Oil Co. The catalytic reforming unit is supplemented with a Udex unit for the recovery of aromatics.

The Marcus Hook unit is a very large one, representing an investment of about $15 million and designed to charge 828,700 barrels per month of straight run naphthas and natural gasoline to the feed preparation section. Charge to the catalyst cases will average about 223,500 b/m when aromatics are produced.

Design of the installation is such that it may be operated to produce high octane motor fuel blending stock or benzene, toluene, and mixed xylenes. Intention is to produce the individual aromatics to the extent that markets will absorb them. The plant is the first to produce aromatics from petroleum for the chemical and fiber industry on the eastern seaboard.

When operated to recover aromatics, the plant will be able to produce about 37,250 barrels monthly of benzene, 38,750 b/m of toluene and 30,000 b/m of mixed xylenes plus 3,550 b/m of heavy aromatics. The unit is capable of producing about six percent of the total United States supply of benzene and 11 percent of the coal tar industry's output. In the case of xylenes, Sun will produce 1½ times as much as the coal tar industry or about 12 percent as much as the entire United States.

Sun is charging the entire straight run naphtha production, which falls within suitable boiling range of the 170,000 b/d Marcus Hook refinery, plus all of the natural gasoline brought in for blending.

The straight run and natural gasoline are prefractionated in the feed preparation section to remove fractions boiling above or below the desired feed stock. Super-fractionation is practised to produce close cuts from large volumes of naphtha. Accuracy is desirable in this section of the plant to minimize carbon-deposition in the catalyst cases and, when aromatics are produced, it is essential to maintain purity of final product.

The first tower depentanizes the gasoline. The overhead from this tower is further split in the second tower into an isobutane and lighter cut, and a normal butane-pentane fraction.

The bottoms from the first tower go to the third super-fractionator where the feed stock for the manufacture of benzene and toluene is distilled overhead. This carefully fractionated stream contains a small amount of naturally occurring benzene and toluene and such naphthenes as cyclohexane, methylcyclopentane, methylcyclohexane and dimethylcyclopentanes.

Three streams are taken from the fourth or xylene tower which is charged with bottoms from the BT (benzene-toluene) tower. Overhead product is a gasoline stream boiling at 211-240° F. and bottoms is a naphtha boiling above 265° F. Side stream is limited to fractions boiling between 240 and 265° F. and rich in ethylcyclohexane, dimethylcyclopentane and trimethylcyclopentane.

The Houdriformer runs alternately on the two stocks in a blocked-out operation. Charge not being processed in the catalytic section is stored.

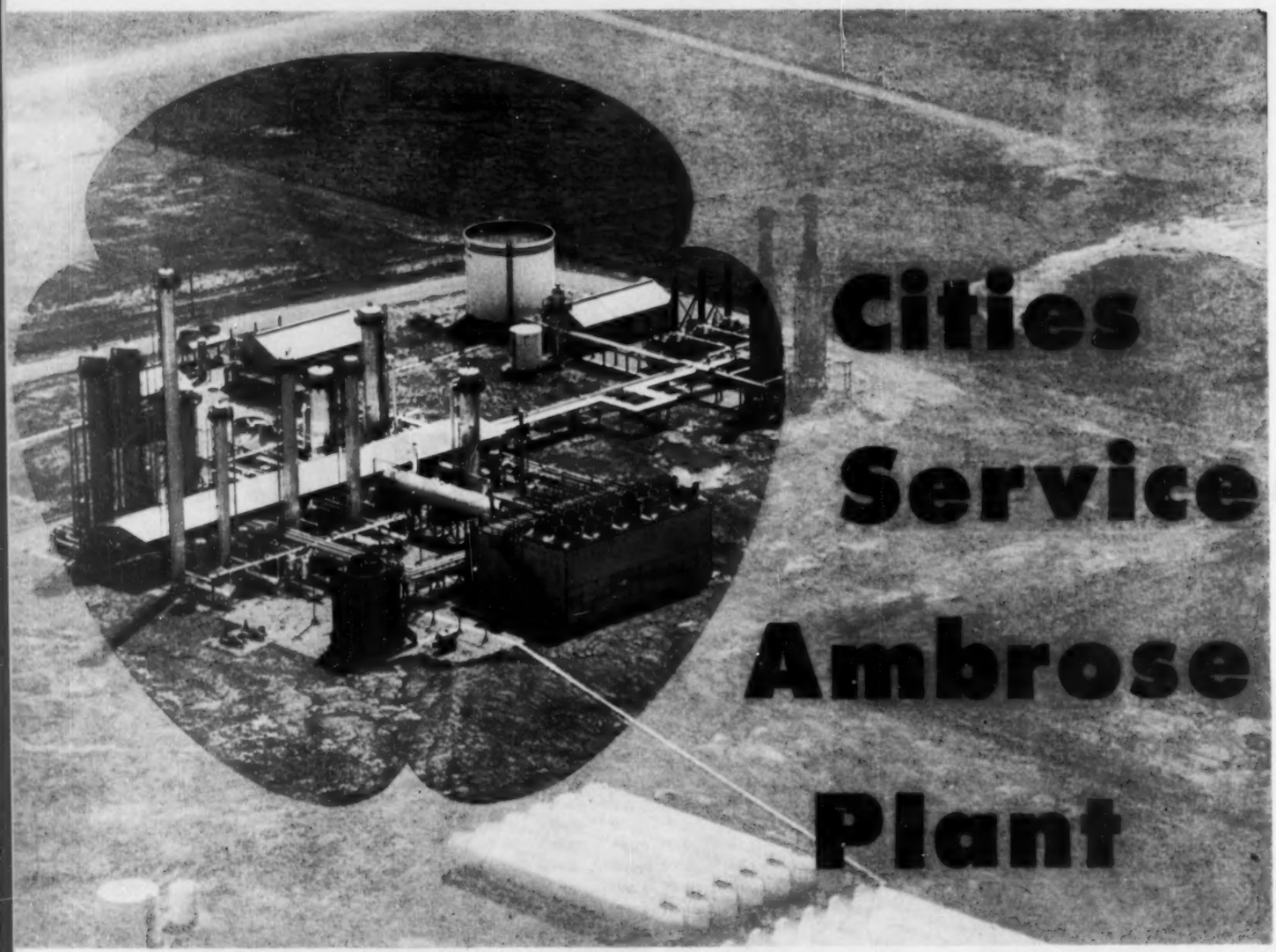
Based on the character of crude and natural gasoline normally processed at Marcus Hook, the feed preparation section will supply 223,500 barrels per month of naphthene-rich feed stock for the benzene-toluene operation. The BT stream boils between 145 and 211° F. The mixed xylenes feed stock, boiling between 240 and 265° F., totals about 110,000 barrels per month. Rejected fractions boiling above and below the desired ranges, totaling about 495,200 barrels per month, are returned to the refinery proper for sale as LPGas or naphtha or for use as motor fuel base stock.

The Houdriforming process employs a platinum catalyst to dehydrogenate the naphthenes. In this particular plant the Houdriformer is divided into two parallel processing sections, each of which consists essentially of four reactors, four heaters to supply the heat of reaction, and compressors for recycling hydrogen. The process is non-regenerative. Catalyst is to be withdrawn and reworked to recover the platinum when necessary. Pilot plant work has indicated a long catalyst life.

The catalyst operates in the presence of hydrogen and at over 900° F. and 300 psi in the BT cycle. When xylenes are being produced, the pressure is increased to about 500 psi. As shown in the flow sheet, over 13 million cubic feet per day of high purity hydrogen is produced as a by-product. Sun is burning the hydrogen effluent at this time and has not yet announced what commercial use will be made of it in the future.

Great care is taken by Sun in the heating and reheating of the Houdriformer

(Please turn to page 78)



Cities Service Ambrose Plant

Since receiving his Master's degree in chemical engineering at the University of Oklahoma in 1945, M. F. Wirges has been employed by Cities Service Companies. He spent his first four years with the Cities Service Research & Development Corporation supervising the development and operation of oxygenated chemicals pilot plants. Mr. Wirges has been with the gasoline - chemical division of the Cities Service Oil Company since 1949, and is presently the chief process engineer of this division. He is a member of the American Institute of Chemical Engineers and is presently serving as vice chairman of the Oklahoma section of this group. He serves also as a member of the technical committee of the Natural Gasoline Association of America and is presently chairman of the Absorption Subcommittee of this group.

By M. F. Wirges

LATEST DEVELOPMENTS in natural gasoline plant technology are utilized in the new Ambrose Gasoline Plant of Cities Service Oil Company. This plant, located at Blackwell, Oklahoma, began operation in May of this year.

On a yearly average, the plant processes 155 million cubic feet of gas daily, and produces 91,000 gallons of propane, 16,000 gallons of isobutane, 51,000 gallons of normal butane, and 40,000 gallons of 18-pound natural gasoline. While recovery of the liquid products is accomplished by a conventional oil absorption - fractionation system, there are a number of "new" or unusual features at the Ambrose plant.

Some of these features are:

(1) The absorber, fractionators and stills all utilize perforated or sieve plate trays. Although these trays are not com-

pletely new to the industry, this is the first plant of its kind to utilize perforated trays this extensively.

(2) Cooling tower construction is also unique. The air used to cool the water is also utilized for aerial cooler service, and when ambient air temperatures are low, a large part of the air is by-passed around the water section. This arrangement results in an appreciable reduction in cooling tower water requirements, and allows aerial coolers to be designed utilizing the wet bulb temperature as design air temperature.

(3) Since the gas processed by this plant has been previously dehydrated by the Cities Service Gas Company, it is desirable to operate so that no additional water is added to the gas stream. To accomplish this and utilize steam for stripping the oil, an unusual stripping column is installed in the plant. The fuel stream is used as a stripping medium for removing water from the lean oil. With this arrangement, the fuel gas serves a dual purpose and no water is added to the gas processed.

The Ambrose gasoline plant is located at the Blackwell, Oklahoma junction of the Cities Service Gas Company's 26-inch transmission line and processes gas from the Hugoton field in the panhandle of Oklahoma. Gas enters the plant at 565 psia and at essentially ground temperature. By location of the plant at Blackwell, the availability of process gas at a relatively high pressure and low temperature resulted in reduced plant investment.

Contractual obligations require the residue gas to have a minimum heating value of 950 Btu per cubic foot. Due to the high nitrogen content of the Hugoton gas (10-12 volume per cent), plant production is limited to about 50 percent of the propane present in the rich gas, and essentially all of the butanes and heavier hydrocarbons. Since it is desirable to remove the maximum amount of production and still maintain a residue gas heating value of 950 Btu's, the plant utilizes a calorimeter to record the heating value of the residue gas and control automatically the amount of oil utilized in the absorbers. This arrangement assures maximum production consistent with the residue gas heating value limitation.

The plant is designed for an ultimate gas volume of 190 million cubic feet of gas with sufficient capacity to reduce the gas from 1,032 to 950 Btu per cubic foot. With this gas rate the daily production will be approximately 250,000 gallons.

Approximately 1,400 gallons per minute of 180 molecular weight absorption oil is circulated when processing 190 mmcf of gas. At this gas rate, 130,000 gallons of makeup water is required daily and approximately four million cubic feet of 950 Btu gas is required for plant fuel.

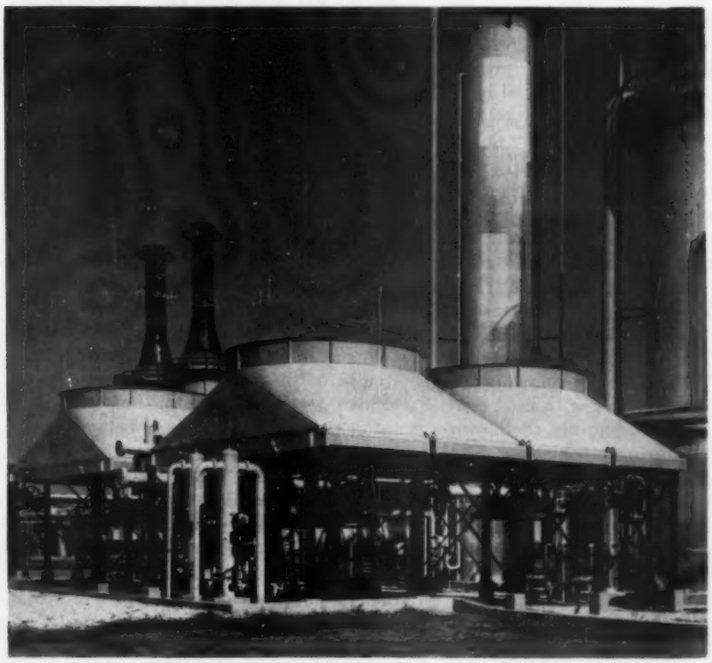
The plant is designed to produce liquid products meeting NGAA specifications, and natural gasoline can be made with a Reid vapor pressure of from 14 to 26 pounds. Performance tests completed to date indicate that the plant satisfactorily meets design requirements. Results of tests on the perforated trays indicate that these trays are capable of exceeding anticipated efficiencies. A comprehensive engineering evaluation is now being completed on the performance of these trays in the various services, and a complete report will be published in the near future summarizing this study.

A simple schematic flow sheet of the plant is shown in Figure 1. Two 24-tray absorbers, 8½ feet in diameter, are utilized in the plant. Lean oil to the absorbers is supplied by steam turbine driven pumps. Oil flow is measured and controlled through a recording flow controller whose control point is set by the recording calorimeter. Lean oil contacts the gas in the absorbers by passing over perforated trays. These trays are similar to bubble trays in that the oil passes across the tray, over an overflow weir, and into a downcomer. Gas passes up through the tray through 3/16-inch holes which have been punched in the trays. Approximately 12,000 perforations per tray are utilized in these vessels. Two intercoolers are used for removing the heat of absorption within the absorber.

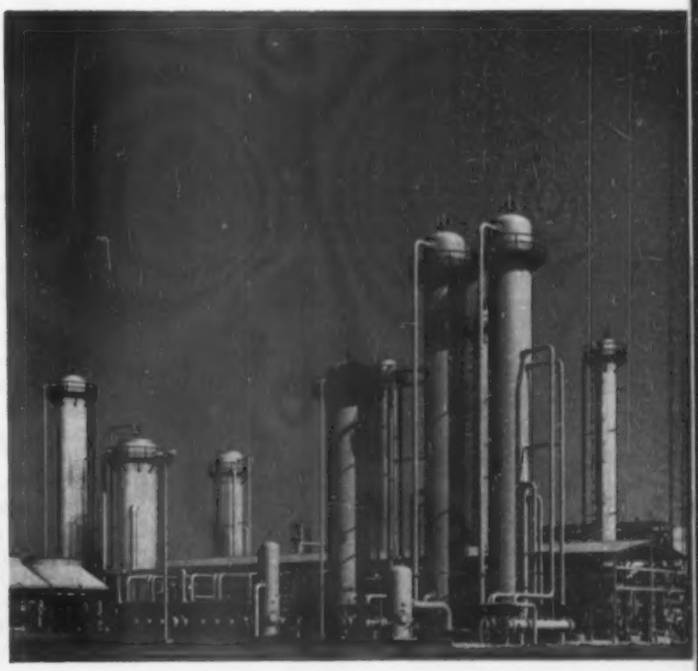
Rich oil from the absorber flows to the rich oil flash tank, where a considerable portion of methane and ethane present in the rich oil is flashed. The reduction in pressure to 300 pounds causes vaporization of about 2.5 mmcf of gas daily. This gas is compressed and recycled to the inlet of the absorber. The rich oil in the flash tank flows to a propanizer column (the only column in the plant utilizing bubble trays.) In this column the noncondensible still vapors are utilized to

(Please turn to page 85)

Fan-operated aerial coolers are utilized for reflux cooling on the high pressure still. The tall tower immediately behind the coolers is the low pressure still.



Each of the two absorbers has a capacity of 120 million cubic feet of gas daily.

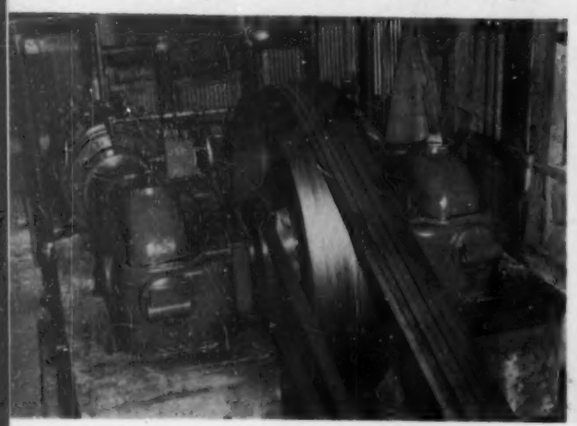


Paul S. Stacey, PhD., is a native of Austria, where in 1914 he became secretary to the board of directors of the Austrian "Credit Anstalt fuer Hendel & Gewerbe" in Vienna. Later he was appointed Councillor of Commerce and as such served on a number of international monetary bodies. He came to the United States in 1940. Dr. Stacey is now president of Enterprise Natural Gas Corp., which he organized to gather gas from shallow formations in Warren County, Pa. His interests in the oil industry of Poland provided a background for this study.

Growing gas markets spur development of shallow sands

By Paul S. Stacey

View of interior of repressure station of Enterprise Natural Gas Corp.



NATURAL GAS, which was found at shallow depths and disdained in western Pennsylvania and adjacent areas generations ago, is now being developed commercially. The wildcatter then sought only oil, he had no market for gas. A gasser was a disaster. Today gas is increasing in value, particularly near gas lines or urban centers in the east.

Government maps, which are marked with the tombstones of the early wildcatter's disappointments, now are guides to modern operators with modest sums to invest. The pattern is simple and pretty much built along the same lines in various states. Take a Pennsylvania set-up as an example. There the Clarendon is outstanding among several producing shallow sands. It is rarely deeper than 1,500 feet, and is known as long-lived. Porosity and permeability are fairly uniform. Exploiting extensive regions where gas wells were abandoned decades ago now seems the reasonable thing to do.

Joint ventures, consisting of different partners in each instance, have been formed. Independent drillers, with their own crews and drilling outfits, are hired on mutually convenient terms.

The federal tax structure is favorable to such ventures. As is known, every working interest participant can lawfully deduct intangible drilling costs in his individual tax return, based on his recorded assignment. In simply equipped shallow gas wells, the intangibles amount to about 75 percent of the investment. Thus, the book value of a well costing roughly $6,000 shrinks to a very modest figure. Tax savings will vary widely, of course, depending on the investor's bracket. In any case, a year's income of about $1,000 per well will take good care of amortization and yield.

Drilling failures in favorable areas are few. In the Pennsylvania case cited there has been only one dry hole out of 28 wells drilled. Drilling in proven territory of this sort involves a mere commercial business risk. Those advancing into the field of semi-proven tracts will of course encounter greater risks.

In the instance cited above, the Enterprise Natural Gas Corp. has acquired a 4½-mile pipe line through which it delivers gas from wells drilled by individuals to the Pennsylvania Gas Co. at Warren, Pa. It has laid its own gathering system to a group of shallow wells and has built a compressor station for delivery of gas at 100 psi to the purchasing company. In addition, Enterprise sells gas to local consumers near the wells who lay their own lines to the company's gathering system.

A combination of joint ventures and the corporation for gathering and marketing has given satisfactory results. Operation of the gas wells and connection lines is vested in Enterprise Natural Gas Corp. which was organized for that purpose. It gathers the multitude of gaseous rivulets, delivering them to the carrier as per contract. Its corporation profits and tax burdens are of minor concern to the drilling partners. Theirs is nothing but the task of contributing drilling funds of personal choice. In this way they enjoy all the tax facilities which otherwise would have to be claimed by a corporation, embracing all phases of the business.

The various groups, working in shallow sands, are in a pleasant strategic position to round off their ⅞ working interests by acquiring landowners' ⅛ royalties in the producing tracts, a definite asset.

In shallow sands royalties can be purchased at reasonable prices. The rosy picture of sudden wealth, stemming from a dream of deep prolific horizons as its potential source, does not normally enter the mind of the selling farmer.

Until recently, a commodity didn't exist on earth whose price and sales quantities could be predicted for two decades. With natural gas, both figures are granted in a number of cases, based on certain long-term purchasing contracts. They provide steadily-increasing fixed prices for definite future periods. Those royalty owners who will be sure to receive ever-growing returns are enviable indeed. Obviously, interests of this kind will rarely see the light of the open market.

Recently, participation in shallow gas wells has assumed a specific meaning for foreign investors. This is true because if a non-resident alien becomes a partner of record in drilling operations, his status as a taxpayer can change. He may request that he be considered as doing business in the United States with tax burdens equalized to those of American citizens.

The foreign participant knows well what he is aiming at by digging a little into American earth. Mere currency conversion, the flight into the dollar, seems no watertight solution in case of general conflagration. Also, investment in any kind of destroyable values would not give peace of mind to the over-cautious considering the atom if worse comes to worst. Therefore, instead of burying his money in sterile gold bars, he buries it in shallow gas wells. The product he has invested in is strictly domestic. It meets the most primitive needs (heating and cooking), so that demand will never cease to exist.

Although about nine-tenths of the present use of natural gas is as fuel, it is being used more widely as a chemical raw material. It is a complex compound. Its components will affect mankind's future well-being in various ways. New insecticides, fertilizers and soil-conditioners of fantastic efficiency are now being created. The world could be clothed with fibers from natural gas and utilize only a fraction of the available supply.

Chemical usage may be contemplated in the future as affecting gas, but today the luxury of such clean, easily controlled fuel is enlarging demand so rapidly that forgotten shallow reserves are being exploited to meet fuel consuming needs.

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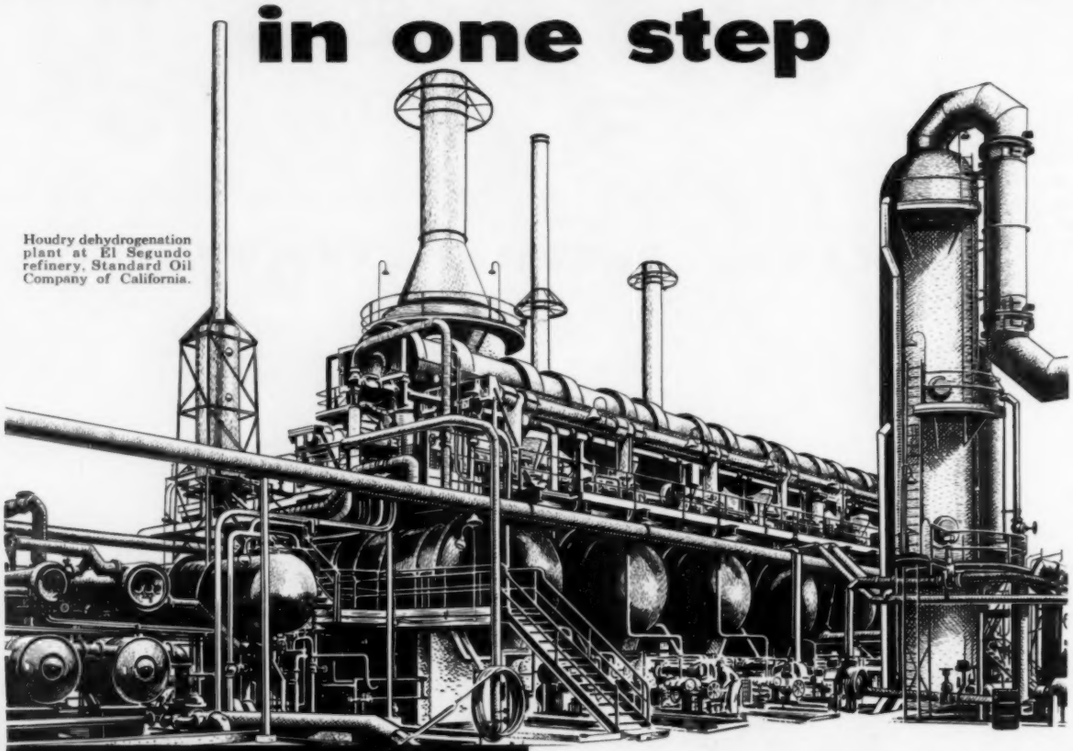

Houdry dehydrogenation plant at El Segundo refinery, Standard Oil Company of California.

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Write on your letterhead for brochure describing Houdry Dehydrogenation Process; economics and flow diagram are included.

Ethyl announces new gasoline additive to control pre-ignition

FOLLOWING EXTENSIVE laboratory and road tests, Ethyl Corporation has announced the development of a new gasoline additive to suppress preignition. The ignition control additive is a haloalkyl phosphorus compound.

Ethyl has applied for patent protection, but patents have not yet been issued. In the meantime results of the research program have been announced to refiners in all parts of the United States and samples have been supplied to those interested in making their own tests.

Commercial quantities of the new additive are not yet available. Ethyl will manufacture the compound at its own plants and large scale production is expected within the next 30 to 60 days.

The price of Ethyl's ignition control compound will be 40 cents per pound in carload lots and 41 cents per pound in less than carload lots, delivered in the United States freight prepaid. Shipments will be made in 55-gallon non-returnable steel drums.

In its experimental work Ethyl researchers used 0.2 theory of phosphorous and 3cc TEL per gallon. This required a concentration of 0.55cc of ignition control additive per gallon of gasoline. A lower lead content would indicate the use of a smaller volume of the new additive.

Ethyl Corp. does not intend to control the manner in which a refiner uses the new product, that is, whether it shall be used in both premium and house brand fuels. Recommendation is, however, that it be used only in premium fuels on the theory that preignition is a problem mainly in modern passenger car engines which normally require premium fuel for satisfactory operation.

In discussing the new compound with prospective customers, Ethyl technologists have pointed out that the new V-8 engines operate over a wider range of power output and that spark plugs thus must function over a much wider range of temperatures. Plugs which work well at high speeds are likely to accumulate insulator deposits under city driving conditions. The new engines also operate at higher pressures and plugs require a higher voltage so that electrical leaks are more critical.

Ethyl also is stressing preignition as a factor which may become more of a limit than ordinary knock in increasing engine efficiency beyond present values. If an effective control can be applied it will be possible to continue the development of engines along the lines now being pursued by Detroit.

Ethyl research has shown that engine design and oil and gasoline characteristics have an effect on preignition. In the case of gasoline, excess octane numbers can be used or fuel volatility increased to suppress preignition. Raising octane numbers is unattractive from a cost standpoint and present car design limits fuel volatility. A motor fuel with a 90 percent point of 411°F. showed a preignition rate of 360 counts per hour, but when the 90 percent point was lowered to 349°F. the preignition count fell to 200 per hour and a 300° fuel had a preignition count of about 20 per hour. Similarly, a motor oil cut with a distillation range of 358 to 419°F. reduced the preignition rate 35 percent below that produced by the whole oil, while a cut with a distillation range of 316 to 344°F. reduced the preignition rate 80 percent below that of the whole oil.

In studying the phosphorous compound in the laboratory, it was found that in single-cylinder engines preignition could be reduced by 70 percent with the additive. Studies then were transferred to multi-cylinder engines operating under road conditions. One phase of the research dealt with exhaust valve life.

A passenger car fleet was used which operated 24 hours a day, five days a week, and averaged 55 miles per hour with a simulated full passenger load. On this schedule each car ran approximately 1,100 miles per day, 20 percent of which was at wide-open throttle on grades. Any fully-loaded car that is driven 1,100 miles per day, five days per week, operating at full throttle 1/5 of the time, must be considered to be in severe service. Two makes of cars were chosen which represented the new V-8 engines.

To study the effect of the additive, a number of cars of each make were run on leaded fuel with and without the ignition control compound until exhaust valve failure occurred. In one make of car exhaust valve life was reduced about 30 percent under severe testing, while in other cars the additive fuel gave valve life equal to that obtained with the untreated fuel. In view of the severity of the service under which these tests were run and the small over-all effect on valve life even under these severe conditions, Ethyl concluded that this side effect will not be significant in any normal passenger car operation.

To evaluate the ignition control of the compound in passenger cars on the road, Ethyl picked conditions conducive to the accumulation of deposits which cause preignition, namely, slow-speed metropolitan area driving. Late model premium fuel cars of two makes were driven by professional drivers on prescribed courses at Detroit and San Bernardino. The test cars were driven in traffic and limited to a maximum speed of 40 miles per hour.

After the combustion chamber deposits were stabilized, the octane number of the fuel necessary to overcome preignition on the road was determined for each of the cars. On the average, it took only 85½ octane number to suppress preignition by using the additive while the same fuel without the additive required 91 octane number for preignition suppression. The effect of the ignition control compound on spark plug fouling was evaluated at the same time and in the same passenger car fleets used for the preignition determinations. In cars of one make, the additive more than doubled relative miles to fouling, while in the other make, the improvement was more than five times.

One of the important advantages of the additive is its ability to correct, quickly and effectively, the problems of preignition and spark plug fouling as they exist in the field. In other words, the ignition control compound will go to work on deposits that have already accumulated in an engine, without the need of removing the spark plugs or cleaning out the deposits. Two to three tankfuls of gasoline treated with Ethyl's additive are sufficient both to control preignition and to return fouled plugs to normal operation.

Accompanying charts show results of road tests on two makes of cars comparing a good grade of leaded premium gasoline with and without the new additive.

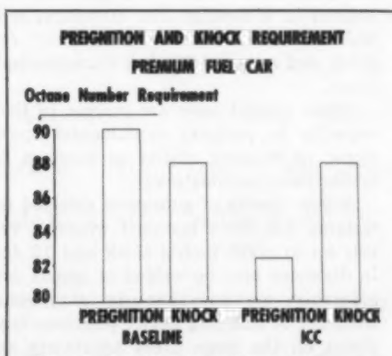


Fig. 1—Road test results on two makes of cars with and without "Ignition Control Compound" (ICC).

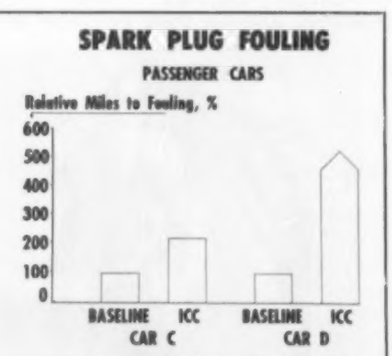
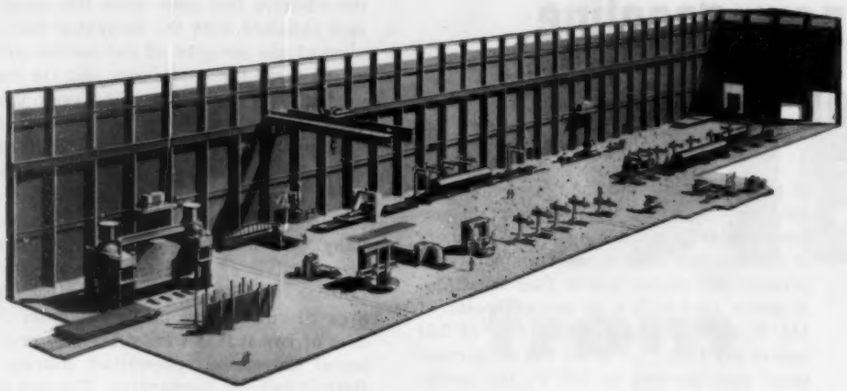


Fig. 2—Chart showing the large increase in mileage before spark plug fouling difficulties with and without ICC.



Artist's view of interior of the new Foster-Wheeler plant. Shown in the rear are: an 8,000-ton beam press, plate edge planer, overhead cranes, double housing planer, automatic welding machines, and drum facing machine. In the foreground are: a 500-ton crimping press, 144-inch vertical boring mill, pinch-type bending rolls and high-speed radial drills.

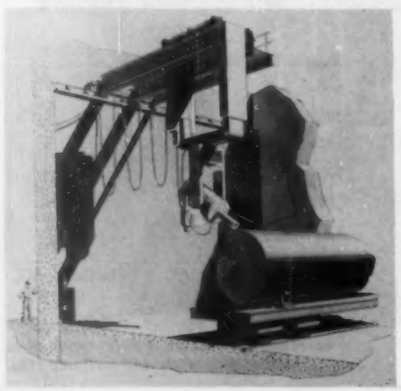
Opens new fabricating plant

FOSTER-WHEELER CORPORATION began operations January 1 at a new $5 million steel fabricating plant nine miles south of Wilkes-Barre, Pa. Part of an $8 million expansion and re-tooling program begun three years ago, the new plant will also help to relieve heavy manufacturing schedules at the corporation's other plants in Carteret, N. J., Dansville, N. Y., and St. Catharines, Ont., Canada.

Among its major tools is an 8,000-ton hydraulic beam press weighing over three million pounds, the largest of its type yet made. It is capable of bending plate eight inches thick.

Another outstanding tool is a 2 million volt Van de Graaf X-ray generator capable of penetrating steel 12 inches thick. The Foster-Wheeler unit is the first application of super-voltage X-ray in private industry. It was put to its first practical test by the U. S. Navy during World War II to determine construction details of enemy ordnance. To guard against rays escaping from the powerful machine, it is housed in a fortress-like structure, with walls of reinforced concrete four feet thick, and removed 550 feet from the main plant.

The 2 million volt crane-supported X-ray generator at the new Foster-Wheeler plant. Walls are of reinforced concrete four feet thick.



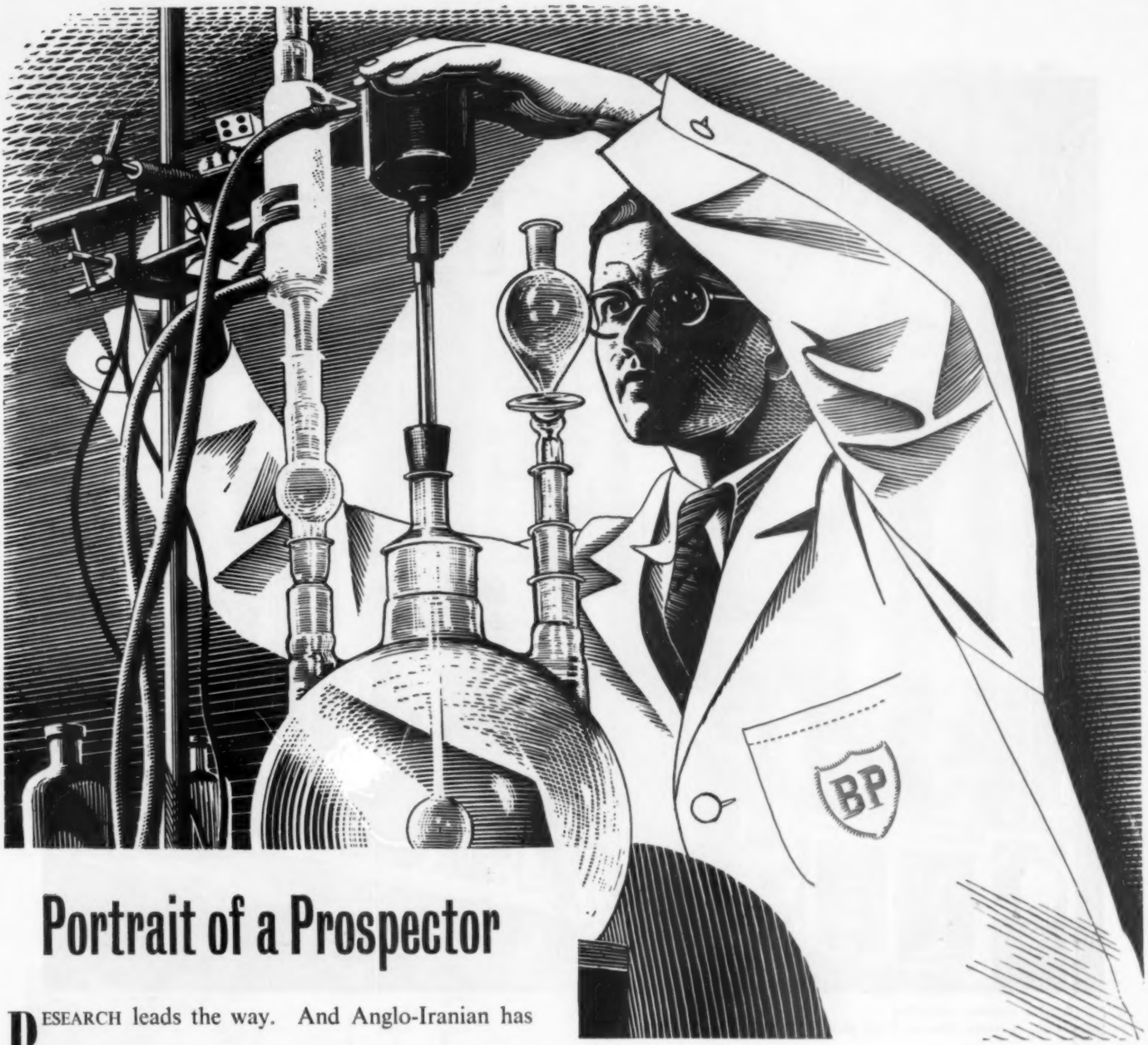
Other special tools are unique in their capacity to perform monumental operations, or in their ability to perform familiar tasks automatically.

A new system of automatic shielded arc welding has been installed whereby vessels up to eight inches thick and 12 feet in diameter may be welded at speeds considerably greater than in single-wire welding. A handling device positions huge plates on the beam press accurately and without appreciable loss of metal temperatures. A series of mobile, high-speed radial drills that may be stationed anywhere along a 230-foot stretch of raised track makes possible the use in combination of as many as six drills.

At the new plant plates are preheated in a propane-fired normalizing furnace, where temperatures as high as 2,100°F. are available. After heating, the plates are carried to the beam press, where they are lifted from the car by an overhead crane and placed on the dies. A built-in plate-handling device positions the hot steel so that there is a minimum loss of metal temperature and accuracy to within a fraction of an inch. The huge press then exerts its 8,000 tons of pressure to form a half cylinder of the steel plate.

After plates are formed into half cylinders, they are moved into the shot blast room to knock off all scale and are then moved to a bed planer for machining welding grooves along both edges of the half-shells. Another tool of unusually large proportions, the bed planer has a table travel area of 44 ft., overall bed length of 92 ft., and width (between housing ends) of 122½ inches. When the planing is complete, shell sections are then assembled by tack welding to form cylinders. The cylinders are then moved to the automatic welding machines, where submerged arc direct current and automatic flux recovery welders traveling along a 150-foot track deposit weld metal in the long seams. Dished ends then are added, circular seams welded and openings cut.

The drum is loaded on a 200-ton flat car and drawn into the X-ray building, after which it is ready for stress relieving in the 83½-foot long furnace. It is then returned to the main building for hydrostatic test and drilling by eight high-speed drills. The vessel is then painted and shipped.



Portrait of a Prospector

RESEARCH leads the way. And Anglo-Iranian has always been a pioneer in research. As early as 1915 the company established a research station at Sunbury in Middlesex which now employs 700 people. The alkylation process was discovered and developed at Sunbury. The gas analysis laboratory there is one of the best-equipped in Europe. At Anglo-Iranian's other main research station at Kirklington Hall in Nottinghamshire, valuable research goes on into prospecting methods and oil-field operation.

Research is an integral part of Anglo-Iranian's many activities. With its subsidiary and associated concerns it is one of the largest and most progressive oil companies in the world.

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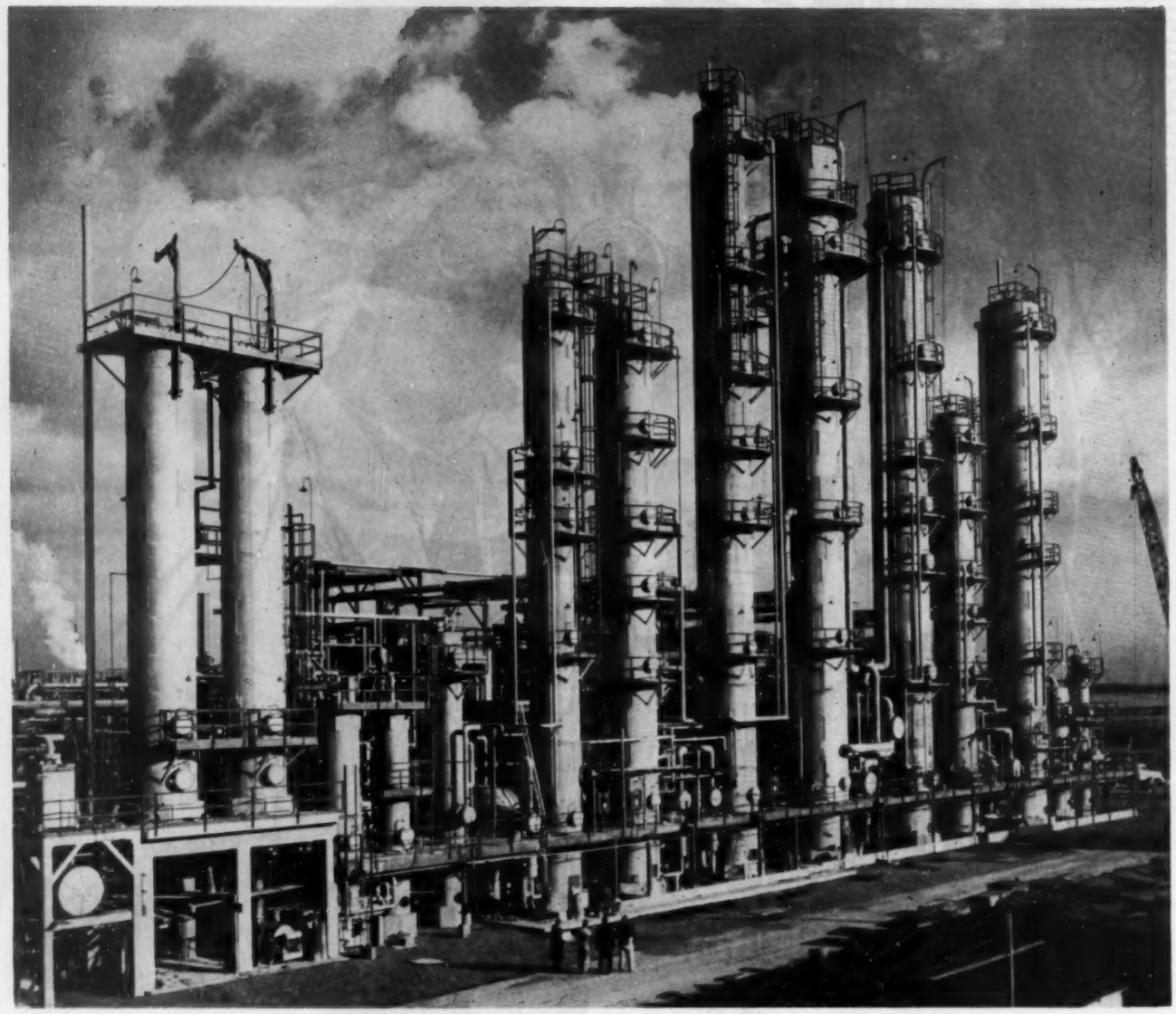


Purification section, including Udex unit, at Sun's Marcus Hook plant.

Aromatics Recovery Plant

(Continued from page 69)

charge as well as in the prefractionation step. Each of the four heaters is divided into three segments and the stream is divided into roughly equal parts and passed through the heaters in parallel. Waste heat boilers are built into each heater to recover heat not absorbed by the charge.

As previously mentioned, Sun has divided the Houdriformer into two parallel sections to achieve greater flexibility and accuracy of control. There are thus eight catalyst cases and eight heaters employed.

Liquid product from the catalytic section during the BT operation is depentanized before charging to the Udex extractor. The Udex unit consists fundamentally of two towers or columns. In the first the benzene-toluene rich stream flows countercurrently to a diethylene glycol solution to extract the aromatics. Unreacted paraffins are taken overhead and returned to the refinery for motor fuel blending. In the second tower of the Udex unit the benzene and toluene are separated from the glycol by distillation. The glycol is then pumped back to the extraction tower for reuse.

Product of the Udex unit consists of a mixture of high purity benzene and toluene which is charged to clay treaters to polymerize undesirable constituents into material boiling higher than either benzene or toluene. The purified aromatics then pass through two more distillation columns. From the first nitration grade benzene is recovered and from the second, nitration grade toluene.

Final products of the Udex unit are 37,250 b/m of benzene, 38,750 b/m of toluene and 2,050 b/m of heavy aromatics.

During the xylene cycle, product of the catalyst cases is fed to two distillation towers in series. The first recovers light gasoline and the second naphtha. A third tower purifies the mixed xylenes by removing a small amount of heavy aromatics, about 1,500 barrels per month. The mixture of about 30,000 barrels per month of ethylbenzene and ortho-, meta-, and paraxylene are to be sold to chemical companies for further separation and processing.

Sun engineers who designed and supervised construction of the Houdriformer have given great attention to safety. Precautions are taken to prevent catalyst degradation through failure of the hydrogen supply. Control-house provisions are made for an instant shut-down of heaters

in an emergency. Three Cooper-Bessemer hydrogen compressors normally are adequate to handle the necessary recycle hydrogen and a fourth unit is in stand-by service.

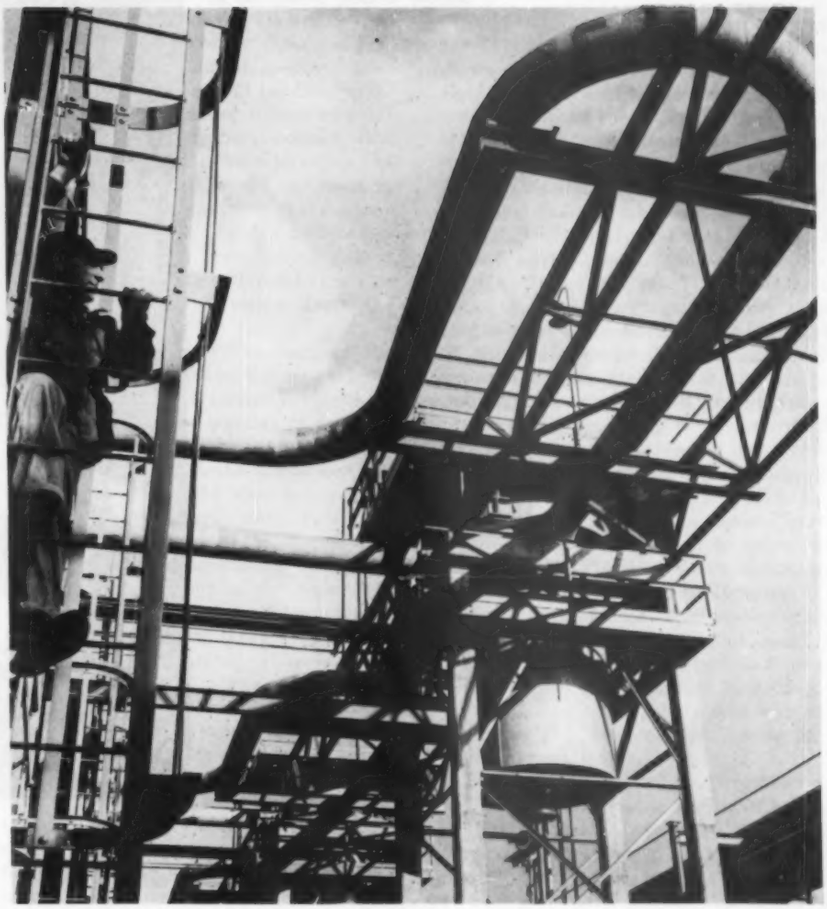
To minimize the danger of line breakage and loss of hydrogen, the designers have attempted to place all possible transfer lines on a single plane.

An accompanying photograph of one group of reactors illustrates this point. Each of the reactors is supported on ball-bearings to permit free movement. Lateral transfer lines and all heat exchangers are supported on rollers. Vertical line movement is facilitated by spring hangers.

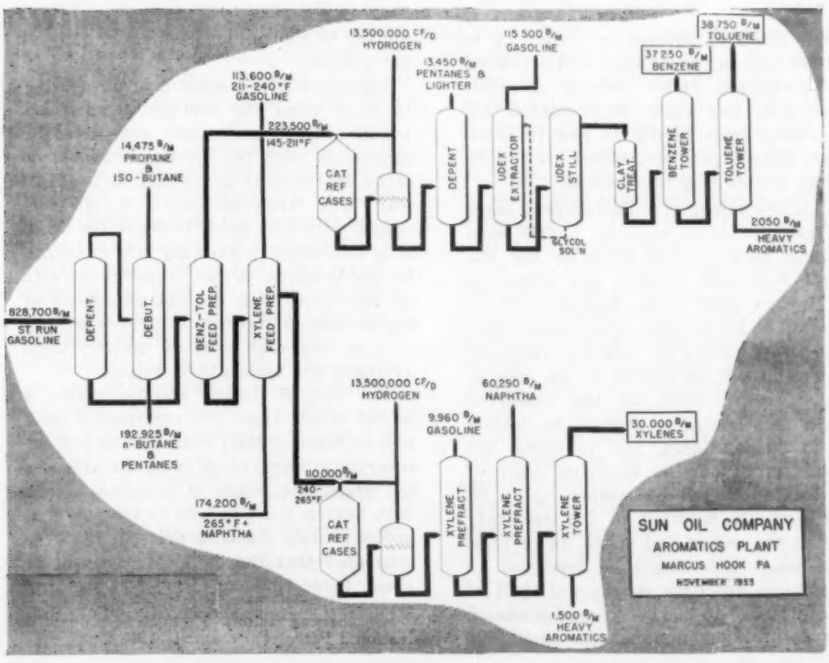
In testing the plant during starting up, all unwelded joints were covered with masking tape with a single small hole punched in each. In this way even minute hydrogen leaks could be detected easily after the system was evacuated and hydrogen circulation begun.

The Houdriformer built by Sun is licensed by Houdry Process Corp. The company is building another unit at Sarnia, Ont. The Udex unit was licensed by Universal Oil Products Co. which developed the extraction system in conjunction with Dow Chemical Co.

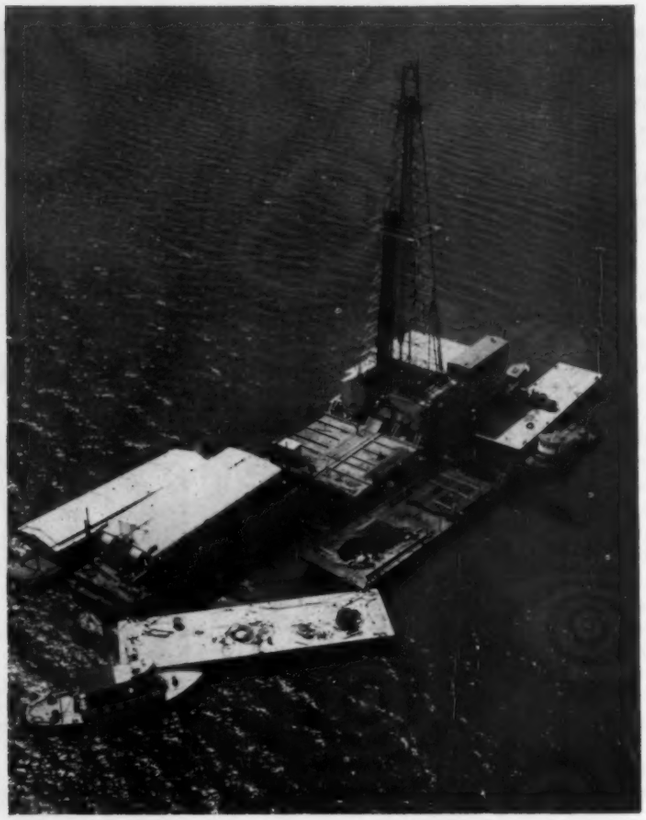
The new aromatics plant is a major step in a series Sun Oil has taken into the petrochemical field. Sun is already a major producer of propylene trimer and tetramer. The company also manufactures sulfonates and a new type of naphthenic acid—high molecular weight and practically free of oil.



Reactors for Sun's Houdriformer are on ball bearings and all transfer lines in a single plane where possible to facilitate movement due to temperature changes.



Flow diagram of Sun Oil Company's aromatics plant at Marcus Hook, Pa.



Marine drilling operations in Louisiana. Photo courtesy Humble.

Operations in the tidelands

By Clayton L. Orn*

WHEN PRESIDENT EISENHOWER, on May 22, 1953, signed the Submerged Lands Act and on August 7, 1953 signed the Outer Continental Shelf Lands Act, the Congress and the President reopened for exploration and development a potential petroleum domain one-tenth the size of the land mass of the United States. The development of this vast submerged area was begun before World War II under leases issued by the adjacent coastal states. It was stopped as to the area adjacent to California on June 23, 1947 when the Supreme Court of the United States rendered its decision in the California case, and as to the areas adjacent to Louisiana and Texas on June 5, 1950 when the court rendered its decisions in the Louisiana and Texas cases.

The shelf adjacent to the United States contains approximately 278,000 square miles. The area covered by waters up to 60 feet deep can be explored and developed for petroleum under present economic conditions, and under technological advancement made during the past 10 years. With more experience, areas covered by deeper waters may be explored.

Only one scientific study has been made of the productive capacity of the continental shelf. It was made by the National Petroleum Council and submitted on May 28, 1953 to the Secretary of the Interior at his request. The Council concluded that during the next five years development will be limited to an area of 14,000 square miles off the coasts of Texas and Louisiana covered by waters up to 60 feet deep, and to about 300 square miles off the southern coast of California covered by waters up to 50 feet deep. It reported to the Secretary that at the end of five years, under ideal conditions, there might be developed an availability from the continental shelf of about 170,000 to 200,000 b/d of crude oil and natural gas liquids, and about 600 million to 800 million cubic feet daily of natural gas.[1]

Estimates of the amount of oil and gas in place under the continental shelf are wholly unrealistic, unless considered in connection with the amount available on shore in times of peace and in times of war. The American public is not concerned with how much is under the shelf. It is interested in knowing how much can be produced at prices competitive with oil recovered from the uplands. Much of the petroleum reserves may be worthless because the high cost of making them available will exceed their value.

The cost of finding and recovering a barrel of oil from the continental shelf will be much greater than finding and recovering a barrel of oil from the uplands; but under the forces of a free economy, both barrels must be sold to the public at approximately the same price. It has been estimated that the drilling costs will be about three times greater, and the pro-

*Condensed from an address before the Division of Production, American Petroleum Institute, Chicago, November 10, 1953.

[1] Submerged Lands Productive Capacity, National Petroleum Council (1953).

duction costs about four times greater.[2] Whether offshore oil can compete with uplands oil will depend to a great extent upon technological developments, economic conditions, and the rules and regulations promulgated by the state and federal agencies. Each lease sold by a state or by the federal government on submerged lands must be sold in competition with leases on the uplands. The unfavorable and burdensome provisions of some leases on the uplands, if written into offshore leases, will deter operators from taking the risks incident to producing oil in the open sea. A spirit of cooperation, confidence, and mutual understanding between the state and federal governments and the industry will be necessary for a maximum development of the petroleum resources of the continental shelf.

The continental shelf was divided by Congress into two areas. The area constituting "lands beneath navigable waters," as that term is defined in the Submerged Lands Act,[3] was awarded to the adjacent coastal states. The remaining area, comprising the "outer continental shelf," as that term is defined in the Outer Continental Shelf Lands Act,[4] was set aside to the United States. The area which will be leased and regulated by the United States is approximately 10 times greater than the area awarded to the states.[5]

The area of the shelf to be administered by the states under the Submerged Lands Act includes the lands covered by tide waters out to a distance of three geographical miles from the coast lines of the states, or to a distance of three marine leagues in the Gulf of Mexico in the event the boundary of any state extended three leagues in the Gulf of Mexico when it became a member of the union. The states will also have jurisdiction over all filled-in, made, or reclaimed lands along their coasts. The cloud cast by the decisions in the California, Louisiana, and Texas cases on their titles to lands beneath navigable rivers within their boundaries has been removed.

Congress did not monument the line between the areas awarded to the adjacent states and to the United States. However, it laid down the essential elements for locating the line which can be applied by officials of the federal and state governments and by the courts. Once the line is located, permanent reference monuments should be set along the coast.

The base line must first be located before the division line can be established. The coast line, under the Submerged Lands Act, will constitute the base line. The coast line is defined in the act as "the line of ordinary low water along the portion of the coast which is in direct contact with the open sea and the line marking the seaward limits of inland waters." Where the coast is in direct contact with the open sea, the base line will follow the line of low tide; but where the coast is broken by rivers emptying into the sea or by bays, estuaries, inlets, and other similar indentations constituting inland waters, the base line will follow the line separating the inland waters from the open sea.

The location of the line marking the seaward limits of inland waters presents difficult legal and engineering problems. If a dispute arises as to whether an indentation in the coast is a bay or other inland water, or as to where the line separating inland waters from the open sea is to be located, the controversy must be settled either by the courts or by appropriate legislation. The unavoidable delays incident to a settlement of the issues will increase the hazards of offshore operations and will retard the search for oil in the areas in dispute. The supreme Court of the United States, even though it rendered its decision in the California case more than six years ago, has not decided some of these complex issues which have arisen along the California coast.

Once the base line has been established it becomes necessary to determine whether jurisdiction of the state terminates at the base line; or extends three miles into the sea; or, in the case of some of the Gulf Coast states, three marine leagues into the Gulf; or, in the case of the Great Lakes states, to the international boundary. If a state has never extended its boundary into the sea, the jurisdiction will end at the base line until it does extend its boundary seaward three miles.

If the Department of State of the United States continues to pursue the foreign policy announced by its Deputy Legal Adviser while testifying before the Senate Interior and Insular Affairs Committee on the Submerged Lands Act,[6] it may take the position that the rights of the Gulf states to the submerged lands between three miles and three leagues is something less than their rights to the area between the base line and three miles. The Deputy Legal Adviser testified that the United States did not claim visa-a-vis the other nations that its territorial sovereignty extended beyond three miles. He said the Department did contend, though, that the United States, or the states (in the event the United States delegated the power to them) could lease and manage the natural resources of the seabed to the outer edge of the continental shelf without exercising territorial sovereignty over the area.

Whether the United States has territorial sovereignty over the area beyond three miles is not decisive of the question of whether Congress has empowered the Gulf coastal states whose boundaries extended three leagues into the Gulf when they came into the Union, to lease and manage the submerged lands between three miles and three leagues. This question must be decided by a proper construction of the Submerged Lands Act, and a correct application of the domestic law of the United States. The Submerged Lands Act and its legislative history show that Congress intended to vest in some of the Gulf Coastal states management and the leasing rights over the seabed out to three leagues. The foreign policy of the nation regarding the extent of its territorial sovereignty cannot take from the coastal states rights which Congress granted them under domestic law.

Each lease issued by a coastal state which had been maintained in force and effect until June 5, 1950 was validated by the Submerged Lands Act. Moreover, the primary term of each lease was extended for a period from May 22, 1953 equal to the term remaining unexpired on December 11, 1950. The extension covered the period during which the lessee was enjoined by the Supreme Court from conducting operations.

The lessee, however, was required to pay to the state issuing the lease, within 90 days from the effective date of the Act, all rentals and royalties payable under the lease after June 5, 1950, or to consent in writing for the United States to pay such sums to the state in the event the lessee had paid the rentals and royalties to the United States.

The states will not have exclusive jurisdiction over all operations to be conducted upon the submerged lands returned to them by the submerged Lands Act. The United States retained all of its navigational rights in and powers of regulation and control of the lands and the navigable waters for the constitutional purposes of commerce, navigation, national defense and international affairs.

The rules and regulations of the United States Coast Guard and the United States Corps of Engineers will continue to apply and must be obeyed.

The states will have control over all geophysical, exploratory, and production operations to be conducted on the lands returned to them by the Submerged Lands Act, but only to the extent that the exercise of such control will not conflict with the rights retained by the United States. Many of the states have regulations governing these operations, some of which involve the payment of substantial fees.

The states will have exclusive jurisdiction over conservation of the natural resources under the lands returned to them. Texas and Louisiana, two of the larger producing states, have adequate conservation laws which are being capably administered. Other states may find it neces-

[2] Report of National Petroleum Council, "Submerged Lands Productive Capacity," p. 43, (1953).
[3] Stat. 29, Public Law 31, 83d Congress, ch. 65, 1st sess.
[4] Stat. 462, Public Law 212, 83d Congress, ch. 345, 1st sess.
[5] Hearings before the Interior and Insular Affairs Committee, United States Senate, 83d Congress, 1st sess., S. J. Res. 13, Feb. 16-Mar. 4, 1953.
[6] Hearings before the Committee on Interior and Insular Affairs, United States Senate on S. J. Res. 13, Feb. 16-Mar. 4, 1953, pp. 1053-1090.

sary to amend their conservation laws.

The area of the continental shelf to be administered by the federal government under the Outer Continental Shelf Lands Act is 10 times larger than the area restored to all of the littoral states. Unlike the states the federal government has never leased for oil and gas any submerged lands adjacent to the shores of the nation. The first law which authorized it to lease offshore lands was signed by President Eisenhower on August 7, 1953.

Prior to the decisions in the Louisiana and Texas cases, a part of the outer continental shelf was under the jurisdiction of Louisiana and Texas. These two states, during the time they exercised jurisdiction over the area, sold many leases in good faith. Each lease sold prior to December 21, 1948 which had been maintained in force and effect under their laws until June 5, 1950 was validated by the Outer Continental Shelf Lands Act.

However, the Secretary of the Interior was authorized to promulgate regulations which are to constitute some of the provisions of the validated leases. He cannot, by his regulations, decrease the area or exclude any mineral included in the lease, or increase the rentals and royalties, or reduce the term of the lease. He has not promulgated these regulations. They will have an important bearing upon future operations under the leases. They should not impose any greater burden on the lessee than was imposed by the lease at the time it was purchased.

The primary term of each non-producing lease was extended for a period from August 7, 1953 equal to the unexpired primary term of the lease on December 11, 1950. This extended term will give the lessee an additional time within which to discover oil and gas, and was granted because he was enjoined on December 11, 1950 from conducting exploratory operations.

Validation of the leases was conditioned upon the lessee's complying with certain provisions of the act, including the filing of a copy of the lease with the Secretary, accompanied by a certificate from the state issuing the lease that it was in force and effect under its laws on June 5, 1950, and the payment of all rentals and royalties accruing after June 5, 1950 which had been paid either to the state or to the United States. No lease validated under the Act will continue beyond five years from August 7, 1953 in the absence of production or drilling operations.

The lessee must pay to the United States, as an additional royalty, a sum equal to the amount of any severance, gross production, or occupation taxes which would have been collected by the state under its laws as they existed on August 7, 1953 had the state continued to exercise jurisdiction over the area. The additional royalty was imposed by Congress to meet the argument of some of the states that the lessee would receive a windfall if the states were not permitted to collect the taxes imposed by their laws upon such production. The additional royalty will not apply to any lease sold by the United States. It applies only to leases sold by the states at a time when the taxes could have been collected on the production.

Some of the leases issued by Louisiana and Texas which were validated by the Submerged Lands Act and the Outer Continental Shelf Lands Act include lands partly within the jurisdiction of the state and partly within the jurisdiction of the United States. These leases were issued by the two states at a time when they were claiming ownership of a much larger portion of the continental shelf than was quitclaimed to them by the Submerged Lands Act. The leases split by this line have, in effect, been divided into two separate leases, one covering lands beneath navigable waters within the jurisdiction of the state, and the other covering outer continental shelf lands within the jurisdiction of the United States.

The line delimiting the area within the respective jurisdictions of the two governments has not been definitely established. Until it is, the lessee will have much difficulty in determining whether he is to comply with the laws of the state or with the laws of the United States.

Congress attempted, in the Outer Continental Shelf Lands Act, to solve in part a situation where a controversy might exist between the United States and a state over the location of the dividing line. It authorized the United States and the state and the lessee to enter into a stipulation impounding the rents and royalties. A more complete solution of the problem must be found to assure an adequate development of disputed areas and to reduce the risks that will be incurred if an operator spends many thousands of dollars without knowing which segment of government owns the area in dispute.

The Secretary of the Interior may in future lease any part of the outer continental shelf for oil and gas, or for sulfur, but he cannot include in one lease oil, gas, and sulfur.

He can determine the areas to be offered and when to be offered. All leases must be sold after published notice on sealed bids under regulations promulgated by him in advance. He must determine in advance of the sale whether he will receive bids on the basis of a cash bonus with a royalty fixed by him or on the basis of royalty with a cash bonus fixed by him.

An oil and gas lease must cover a compact area not exceeding 5,760 acres. It will continue for a period of five years and as long thereafter as oil or gas is produced in paying quantities, or drilling or well reworking operations to be approved by the Secretary are conducted on the premises. It must require the payment of a royalty of not less than 12½ percent in amount or value of the production saved, removed, or sold from the premises. It may contain such rental provisions and other provisions as the Secretary may prescribe at the time of offering the area for lease.

Water operations are quite different from land operations. This difference was recognized by Congress when it prescribed in the Outer Continental Shelf Lands Act a leasing policy wholly dissimilar to that contained in the Mineral Leasing Act.

The Secretary has not promulgated rules and regulations for the leasing of the outer continental shelf, nor has he published a lease form. When published, if the regulations and lease form permit government intervention only when necessary to protect the rights of the United States, more operators will spend more money to find more oil.

Geophysical operations are under the jurisdiction of the Secretary of the Interior. The Secretary on September 22, 1953 promulgated a temporary rule regarding these operations.[7] The rule applies only to those areas included in an agreement between the Secretary and the appropriate state officials for the protection and conservation of aquatic life. In such areas, an operator may conduct geophysical operations on the outer continental shelf if he has obtained a permit from the state for similar operations on the adjoining areas under the jurisdiction of the state; has obtained a permit from the Corps of Engineers; and complies with the rules of the adjoining state governing operations on submerged lands of the state. An agreement of this character has been entered into between the Secretary and the State of Texas.

The laws applicable to the waters above the outer continental shelf are not the same as those applicable to the natural resources of the outer continental shelf and to the structures erected for their removal. The United States still recognizes as high seas the waters above the outer continental shelf. The rules of international law regarding freedom of the seas are applicable to these waters. Foreign vessels can navigate them without obtaining permission from the nation.

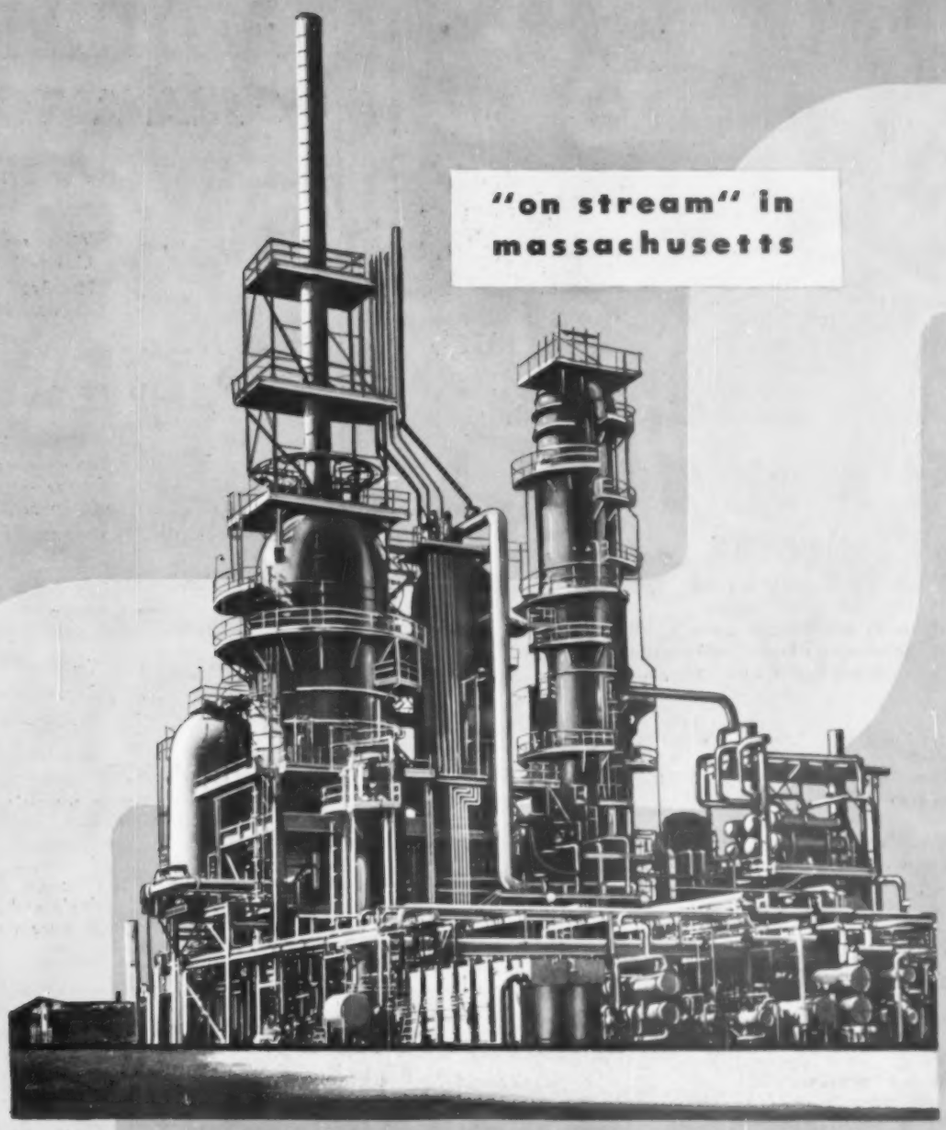
Many of the states urged Congress to permit them to extend and enforce their laws to the portions of the outer continental shelf opposite their shores. Their contentions were met with vigorous opposition by federal officials. After a long hearing and debate, Congress settled the controversy by extending to the subsoil and seabed of the outer continental shelf all federal laws and such state laws as are not inconsistent with the federal laws. It charged the federal officials with enforcing these laws and denied jurisdiction to the states.

The areas of the outer continental shelf over which the federal officials will apply

(Please turn to page 92)

[7] 18 F.R. Number 186, p. 5667, September 23, 1953.

"on stream" in massachusetts



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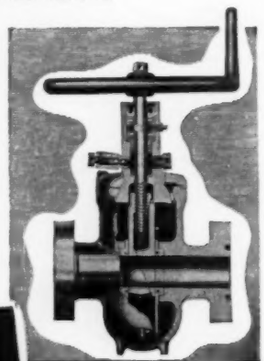

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Cities Service Plant

(Continued from page 71)

strip the methane from the rich oil. Operation of the column is simple and essentially automatic. If too much methane remains in the rich oil in the bottom of the column it will cause more uncondensed vapors to accumulate in the raw products tank. These uncondensed vapors then pass back into the bottom of the propanizer and increase the stripping of methane. This, in turn, reduces the amount of methane passing into the raw products tank. Thus, the column performs a function somewhat similar to a rich oil demethanizer. Rich oil from the base of the column is pumped through an oil to oil exchanger into the high pressure still. In the high pressure still, sufficient vapors are stripped from the rich oil so that when the remaining products are stripped in the low pressure still, total condensation is possible. To accomplish optimum stripping in the high pressure still, the stripping steam rate is controlled by the pressure of the low pressure still.

The uncondensed vapors in the high pressure still, and the products from the low pressure still, are pumped into a raw products tank. The uncondensed vapors from this raw products tank return to the propanizer, as previously discussed.

Two gas-fired radiant-convection oil heaters are installed to supply the heat for the oil system; heat transferred to the rich oil by each of the furnaces is approximately 29 million Btu/hr. The control system on these heaters is arranged so that excess stack temperature or low oil circulation rate will stop the flow of fuel gas.

Usually, in modern plants, plant fuel is taken from one of the process streams in the plant such as a flash tank or the residue from a rich oil fractionator. This is done to eliminate recompressing this gas for return to the residue gas stream and expensive operation. However, when these low pressure streams are burned for fuel, a high Btu gas is normally consumed. With production from the Ambrose plant limited to a fixed residue heating value, it is more profitable to return the rich plant streams and burn absorber residue gas for fuel. Since residue gas is available at 565 psia and the fuel system requires only 35 psia, the energy available in this gas is recovered by the use of an expansion turbine which drives a process rich oil pump. Gas, after expansion through this turbine, is used for removing water from the lean oil prior to entering the fuel system. The dehydrator column utilized for this service is eight feet in diameter and the stripping section contains eight perforated trays; the lower section of this vessel serves as the lean oil surge tank.

The cooling tower, as discussed earlier, is divided into a water cooling section and an air cooling section, with approximately 27 million Btu/hr removed in the water cooling section and approximately 28 million Btu/hr removed in the air cooling section. The fans utilized in the cooling tower consist of ten 11-foot, 345 rpm fans, each fitted with a 20 hp electrical motor.

Approximately 4,500 gallons per minute of warm water is circulated from the base to the top of the water cooling section. Water is distributed at the top of the cooling tower and passes down through the section and over the cooling coils similar to any induced draft cooling tower. Air is drawn in and counter-currently contacts falling water, then proceeds through extended-surface aerial coolers. Water consumption is reduced by decreasing the flow of air through the water cooling section when the atmospheric temperature is below 100°F. This is accomplished by louvers (automatically controlled by atmospheric temperature) in the closed side of the structure which permit the air to bypass the cooling water section. Cooling tower auxiliary facilities include a pH recorder and an acid pump which injects a controlled amount of acid per unit volume of makeup water.

Feed water for the boiler system is treated by ion resins in two vessels. The first vessel removes the hardness and the second removes bicarbonate, sulfate and nitrate ions. Brine solution is utilized to regenerate the softener and the dealkalinizer. The treated water then passes into the boiler feed tank and through the deaerating heater into the boiler system. Three water tube boilers are installed, each rated for continuous duty at 27,500 lb/hr and 350 psig, with feed water at

(Please turn to page 86)

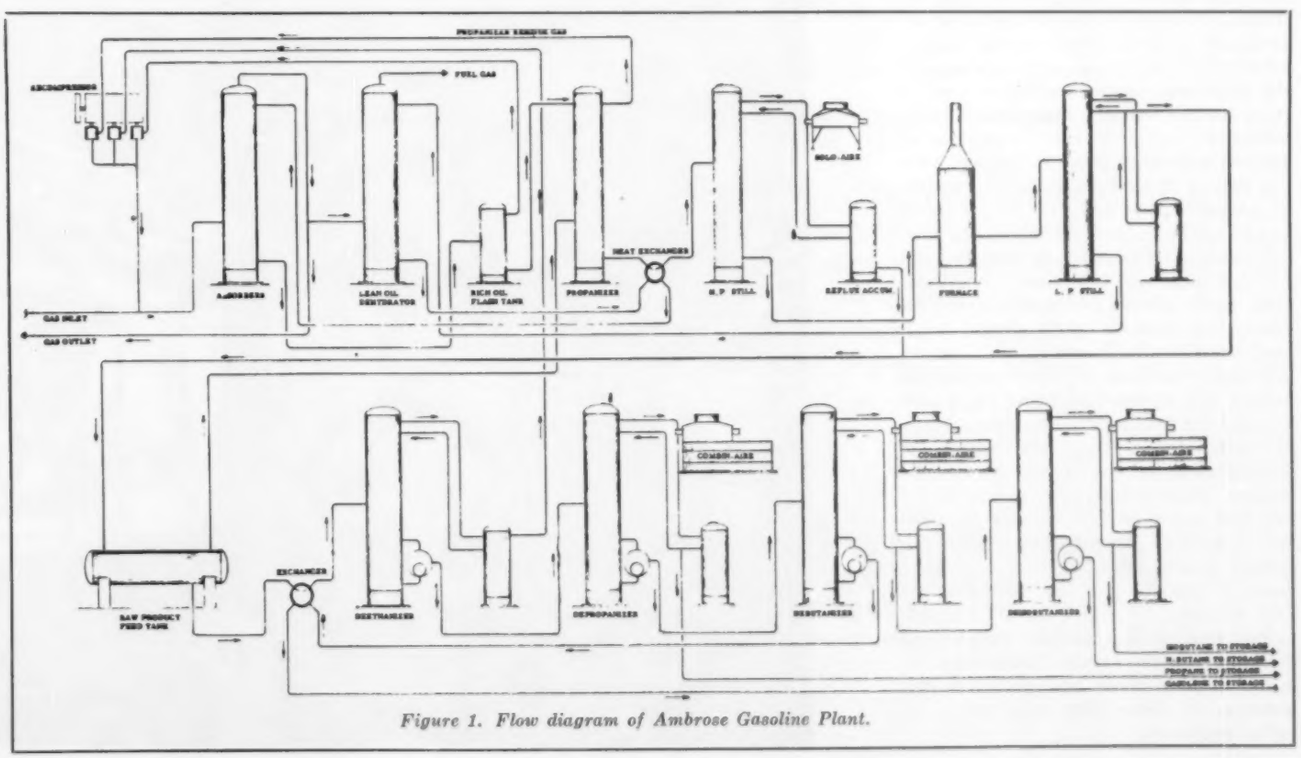


Figure 1. Flow diagram of Ambrose Gasoline Plant.

Cities Service Plant

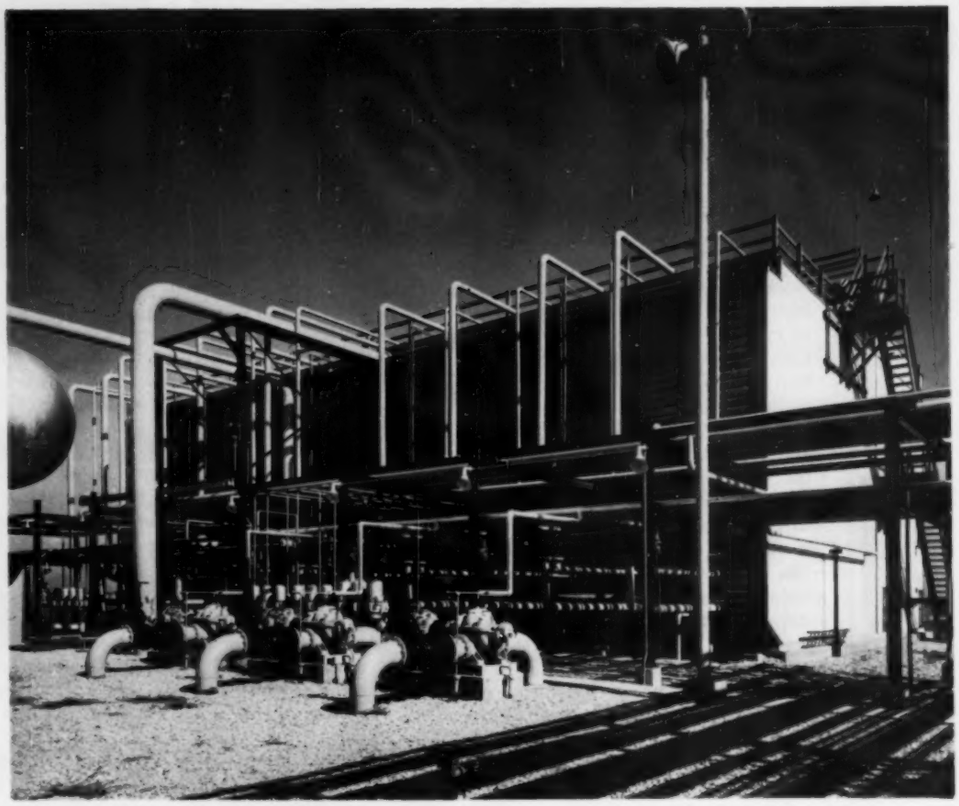
(Continued from page 85)

210°F. Boiler accessories include induced draft fans, driven by electric motors, and high and low water alarms. Two steam systems are used, one at 350 psig and the other at 50 psig. The major use of high pressure steam is in the lean oil pump turbine and deethanizer feed pump turbine. Exhaust from these turbines supplies most of the 50-pound steam requirement. Clean condensate from the reboilers and steam bundles, not having been in contact with oil or hydrocarbons, passes directly into the deaereating heater. Oily condensate is passed into a classifier for removal of any hydrocarbons or oil. Oil from the top of the classifier returns to a skimmer basin and then is automatically pumped into a waste oil tank. Current operations indicate that 97 percent of the steam condensate is returned to the boilers.

Electric power for the plant is generated by three 300 kw 440-volt generators, with two of these units adequate for full operating load.

The product fractionation system at the Ambrose plant consists of a deethanizer, depropanizer, debutanizer and de-isobutanizer. The arrangement and instrumentation of these towers are conventional. Perforated trays are used in all of the fractionator columns. An automatic blending control system is provided for blending propane into normal butane for production of propane-butane mixtures. The unit measures the normal butane stream into storage and automatically blends the required amounts of propane into the stream. Normal butane storage tanks are arranged so that either normal butane, iso-butane or gasoline may be stored, and the iso-butane tanks can also be used to store normal butane. Approximately one million gallons of storage, consisting of 420,000 gallons of propane storage, 140,000 gallons of iso-butane, 210,000 gallons of normal butane, and 210,000 gallons of gasoline is available at the plant. All storage tanks are 126 inches in diameter and 153 feet long, and hold about 70,000 gallons. Both railroad and truck loading facilities are provided in the plant. A 32-spot, double railroad loading rack has one side piped for loading iso-butane, normal butane and propane, and the other side is piped for loading propane only. Vertical, motor driven pumps are utilized for loading propane, iso-butane and normal butane. These pumps have a capacity of 300 gpm and a common spare is provided for all services. Two 3-stage centrifugal, vertical pumps are utilized for pumping gasoline into the pipe line to the Ponca City refinery.

The Hudson Engineering Corporation designed, engineered and constructed the complete plant under the inspection and approval of Cities Service gasoline division engineers.



This view of the combination cooling tower shows the atmospheric coil side together with the water circulation pumps.

Process pipe and pumping area.

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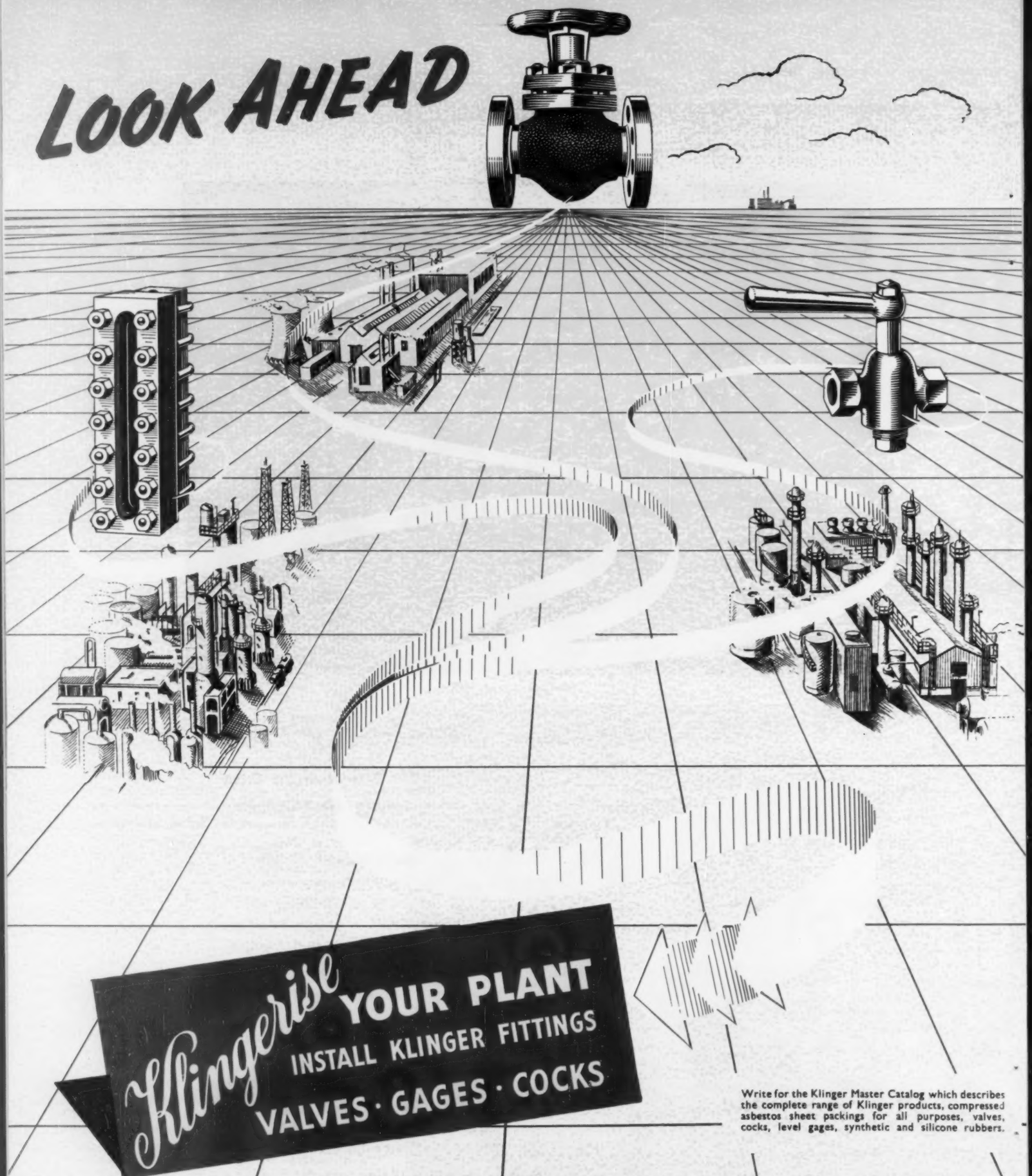

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BRITISH OIL NEWS

By E. Lawson Lomax

Resumption of diplomatic relations between Britain and Iran is welcomed as opening the way for direct discussion between representatives of the two nations on matters of mutual concern. It is heralded also as a first step toward settlement of the controversy over Iran's seizure of British oil properties, although it is recognized that prolonged negotiations probably will be necessary before all the areas of disagreement are covered. London opinion is that a considerable time must elapse before Iranian oil can begin to flow into international channels.

Petroleum Equipment Sales

The value reported by the Council of British Manufacturers of Petroleum Equipment for orders placed with its members during the third quarter of 1953 was £14,925,300 ($41,791,000). This was less than the sums reported for the two preceding periods and substantially below the record established in 1952. That was a time when a tremendous volume of construction was under way in the United Kingdom. The more recent figures seem to indicate that the intensive period of activity in building up the British oil industry has passed its peak and that new construction, expansion and replacement of equipment is tapering off to a more normal level.

Principal items of equipment and materials as shown by the report for the third period of the year are as follows:

	£
Geophysical and other exploratory equipment	4,900
Specialized equipment for oil drilling & production including casing & tubing	2,158,600
Specialized equipment for refineries (not including pumps & valves)	483,800
Drum & can-making, filling & cleaning equipment, curbside pumps & other metering & dispensing equipment	180,700
Railcars, road tankers & aircraft refuellers	60,500
Drums, drumsheets & tinplate	1,324,000
Tankage (including tank fittings)	1,335,800
Tubulars, pipe fittings & valves (ferrous and non-ferrous)	1,627,000
Pumps (excluding slush, oilwell & curbside)	193,300
Boilers, boiler house plant & accessories	55,400
Electrical equipment (motors, generators & transformers)	1,072,600
Instruments (meters & gauges)	185,900
Prime movers & compressors	492,200
Machine & hand tools, welding & miscellaneous machinery & stores	1,138,300
Ferrous & non-ferrous plates, sections, sheets & bars	445,000
Automotive equipment, all types	1,010,100
Laboratory equipment & chemicals including hospital & medical supplies	95,200
Bulk chemicals, catalysts & barites	1,626,800
Cement & other building materials & hardware, including timber	589,800
Commissary, general requisites for office, warehouse, household, club & sports	845,400
	£14,925,300

Europe's Largest Refinery

With the completion and commissioning of its new 3¼ million tons per year distillation unit, the Royal Dutch/Shell Pernis refinery (near Rotterdam) becomes the largest refinery in the whole of Europe. The new unit, designed by Shell, cost £2,000,000 to build, and has taken over a year to erect. It brings the annual crude capacity to a total of nearly 10 million tons per year. Before the war Pernis had a capacity of about one million tons per year, and the increase to its present capacity has cost over £25,000,000.

Oil Show in Nigeria

The Shell D'Arcy Petroleum Development Company of Nigeria Ltd. (jointly owned by Shell and Anglo-Iranian) announces that a small indication of oil has been encountered in a test well being drilled at Akata in the Calabar province of eastern Nigeria. The oil is associated with a considerable volume of gas.

This follows several years of exploration in that area, but it is too early to say whether it may lead to commercial production. Testing, however, is being carried on.

The company has a concession of 56,000 square miles in the southern part of Nigeria, with additional rights over Nigerian territorial waters. A previous test well at Owerri was drilled to 11,000 feet, but found to be dry after some gas had been encountered.

Passenger Launch for Lake Maracaibo

Trials of a triple-screw passenger launch built by John I. Thornycroft & Co., Ltd. at the Woolston (Southampton) Shipyard to the order of the Anglo-Saxon Petroleum Co. Ltd. have recently been completed.

It will operate on Lake Maracaibo, Venezuela, where Compania Shell de Venezuela Ltd. is carrying out off-shore drilling in open water some 24 miles from the eastern shore of the lake.

Its main service will be to carry shift crews to and from the drilling locations three times per day. It will have to operate to a strict time schedule in all conditions of weather without a break and so has been stoutly built.

The propelling machinery comprises three Rolls-Royce, six-cylinder diesel engines with a bore of 5⅛ inches and a stroke of 6 inches, each engine developing 190 bhp at approximately 1,800 rpm and giving a service speed of 18 knots. The engines are direct drive, fitted with oil-operated reverse gears made by Self Changing Gear Co., and are completely controlled from the wheelhouse, the controls being by Blocktube Company.

Accommodation seats with tubular frames and detachable cushions are provided for 20 passengers. The hull is of specially strong construction to enable it to stand up to arduous conditions of operations.

New Strike in Basrah

New sands have been struck by the Basrah Petroleum Co. about 20 miles west of their Zubair field at Rumaila. The test well found the sands in October in the same formation as the producing zone at Zubair, at a depth of over 10,000 feet. Routine tests are being carried out.

Oil Industries Club Dinner

The 17th annual dinner of the Oil Industries Club, under the presidency of C. A. P. Southwell, executive head of Kuwait Oil Co., Ltd., was held at Grosvenor House on November 24. Over 1,250 guests included prominent members of HBM Government, Navy, Army, Air Force and Civil Service, together with leading members of the petroleum and other industries.

After the Loyal Toast, proposed by the president, the health of the Oil Industries Club was proposed by Sir John Maud, permanent secretary to the Ministry of Fuel and Power.

In his speech Sir John emphasized the value to the petroleum industry of a club of this kind in which a lot of people try to be agreeable to the same lot of people, namely themselves, which is directly opposite to the Prime Minister's recent description of world affairs as "a lot of people trying to be disagreeable to a lot of other people." He also stressed the importance of the part the oil industry has played in providing for the annual average increase in the world's consumption of energy, and concluded by saying that the petroleum industry supplies the oil for the wheels of commerce and for the troubled waters of international finance.

Reply to the toast was made by the president, who said the club, like many others, started in a coffee house and has shown continuous growth with the years. Through it, barriers were broken down, water-tight compartments were eliminated, and people of various branches of the industry got together in a friendly atmosphere.

He welcomed the many guests present and coupled with this welcome the name of Lt. Gen. Sir Humphrey M. Gale, who had served on General Eisenhower's staff as chief supply officer.

In reply, Sir Humphrey paid tribute to the large amount of industrial, scientific, technical, administrative and commercial skill which had been and was being put into the industry.

Launch built by Thornycroft & Co. for use of Compania Shell de Venezuela in Lake Maracaibo drilling operations.

OIL COMPANY STAFF CHANGES

EUGENE HOLMAN was elected chairman of the Standard Oil Co. (N. J.) effective January 1 following the retirement of Frank W. Abrams. Mr. Holman continues as chairman of the executive committee and chief executive officer of the company.

Succeeding Mr. Holman as president is M. J. Rathbone, a director and formerly president of Esso Standard Oil Co.

Lloyd W. Elliott was elected a vice president to succeed Orville Harden, who retired after 43 years with the Jersey company. Chester Smith, a vice president, was elected to membership on the executive committee. Frank W. Pierce, who has been in retirement since last March because of ill health, resigned as a director on January 1.

In honor of his 42 years of service to the company, it was announced that the directors have made a grant of $100,000 to Mr. Abrams' alma mater, Syracuse University. Mr. Abrams joined Jersey as a refinery draftsman in 1912. He advanced step by step through the refining department as plant engineer, assistant superintendent, superintendent, manager, general manager of refineries and president of the refining subsidiary. In 1936 he was elected a director of the parent company, a vice president in 1944 and chairman in 1946. Outside the oil industry his interest has centered on education, a field in which he has been honored by many honorary university degrees and by election as a trustee of the Sloan Foundation, trustee of the Ford Foundation and a trustee of Syracuse University.

Mr. Holman joined Humble Oil & Refining Co. in 1919 as a geologist and was assigned to the north-central Texas oil fields shortly after receiving a master's degree in geology from the University of Texas. He became superintendent of the Louisiana-Arkansas division in 1923 and two years later was appointed Humble's chief geologist. Transferred to New York City in 1929 to become assistant to a Jersey Standard vice president in charge of crude oil production, Mr. Holman became interested in foreign producing problems, particularly in South America. Subsequently, he served as president and director of Creole Petroleum Corp. and Lago Petroleum Corp., Venezuelan affiliates of Jersey Standard.

Named a director of Jersey in 1940, he was elected a vice president in 1942 and later a member of the executive committee. He took over the presidency of the company on June 12, 1944 and in January 1946 became chairman of the executive committee.

Mr. Rathbone joined the Jersey organization 32 years ago as an engineer at the Baton Rouge refinery of Standard Oil Co. of Louisiana. He rose to president of Louisiana Standard and in 1944, when the company was merged with Esso Standard, he came to New York as president of that subsidiary. He moved to the parent company as a director in 1949.

Mr. Smith was first employed by the company in 1908. He has been manager of Esso Standard's Bayonne refinery, director, vice president and president of Esso Standard. He was elected to the Jersey company board in 1944 and became a vice president in 1946.

Mr. Elliott was president of Standard-Vacuum Oil Co. when he was elected to the Jersey board of directors in 1951. He got his start in the oil business in Tulsa, Okla., in 1916, when, still in preparatory school, he joined the Carter Oil Co., a Jersey affiliate, to do summer work with field geologists. He served in the U. S. Army in France in World War I. Later he was associated with Jersey affiliates in Mexico and in Indonesia until he was elected president of Standard-Vacuum.

Mr. Elliott was in Indonesia when the Japanese invaded that area in 1952. After eluding capture by the Japanese and reaching Australia, he was commissioned in the U. S. Army and served with the Southwest Pacific forces as chief petroleum officer. When he left the service he held the rank of Colonel. Later he was advanced by the president to the rank of Brigadier General in the Officers Reserve. For his military service he received the U. S. Distinguished Service Medal and was also decorated by the Netherlands Government.

Orville Harden, retiring after a long and distinguished career with the company, was the youngest man ever elected to Jersey's board. He started with the company in 1910 as an office boy. He was elected a director in 1929 at the age of 35. He became vice president in 1935 and since 1942 has been vice chairman of the executive committee. For his assistance to the French Government in the petroleum field, he was honored after World War II with the Order of Commander of the French Legion of Honor.

W. C. HAWK, Oklahoma City, central region exploration manager of Continental Oil Co., has been promoted to manager of the company's geological section, with headquarters in Houston. He is succeeded by B. G. Swan, Ponca City, Okla., assistant manager of the geological section. Frank Searcy and L. E. Whitehead, both of Ponca City, division superintendents in the geophysical section, were promoted to assistant managers of the geophysical section.

LESTER B. SWAN has been named executive vice president of Brazos Oil and Gas Co., Houston. He was formerly assistant general manager and coordinator of research for Dowell, Inc., Tulsa. Both Brazos and Dowell are subsidiaries of the Dow Chemical Co.

Eugene Holman

F. W. Abrams

M. J. Rathbone

C. F. Smith

Orville Harden

L. W. Elliott

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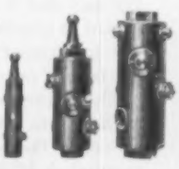

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Operations in the Tidelands

(Continued from page 82)

the state laws are to be defined by the President. In defining the line, he is required to extend the boundary lines of the littoral states seaward to the outer edge of the continental shelf. To date he has not delimited these areas. When he does, an operator searching for oil in the area must first examine the federal laws and then the state laws, and then determine the extent to which the state laws are not inconsistent with the federal laws. Difficulties will be encountered in ascertaining which laws are applicable, all of which will increase the cost of finding and producing a barrel of offshore oil.

The workmen's compensation laws of a littoral state will not apply to an employee working on structures erected on the outer continental shelf. The Act expressly provides that compensation shall be payable under the provisions of the Longshoremen's and Harbor Workers' Compensation Act.

However, the Longshoremen's and Harbor Workers' Compensation Act does not apply to a master or a member of the crew of a vessel. The Jones Act covers all seamen injured while engaged in operations on the outer continental shelf. The Jones Act, unlike the workmen's compensation laws of the state, imposes no limitation on the amount of damages an injured seaman may recover. The employer must determine whether his employee will be a seaman under the Jones Act, or an employee under the Longshoremen's and Harbor Workers' Compensation Act.

The adventurous operator who goes to sea to produce oil will not escape the Taft-Hartley law. If he commits an unfair labor practice, the Labor Board will not try him on the structure; but it will try him in the judicial district of the adjacent state nearest the structure.

The Coast Guard has the authority to promulgate and enforce reasonable regulations with respect to lights, warning devices, safety equipment, and other matters relating to the promotion of safety of life and property on a structure. It may mark, at the expense of the owner, for the protection of navigation any structure which the owner has failed to mark in accordance with its regulations. The industry may find it necessary to ask the Coast Guard to eliminate some of its rules which are unnecessary and materially increase the cost of operations.

The Secretary of the Army will have authority to prevent obstructions to navigation in the waters above the outer continental shelf, even though the waters are a part of the high seas. He can establish sea lanes and anchorages, and restrict or eliminate drilling in the area.

The Secretary of the Interior, upon recommendation of the Secretary of Defense, during a state of war or national emergency declared by Congress or the President, may order operations suspended under any lease; but just compensation must be paid by the United States to the operator.

The Secretary of Defense, with the approval of the President, may designate restricted areas needed for national defense where no operations can be conducted.

These unusual provisions, which Congress deemed necessary for the defense of the nation, are cumulative evidence of the increased hazards of offshore operations.

Pipe line easements may be obtained from the Secretary under regulations promulgated by him. An operator who obtains an easement must operate as a common carrier.

The Secretary is authorized to promulgate and enforce rules and regulations for the prevention of waste and the conservation of the natural resources of the outer continental shelf, and for the protection of correlative rights. The Secretary is expressly authorized, in enforcing the conservation rules, to cooperate with the conservation agency of the adjacent state. The state agencies have jurisdiction over the conservation of the natural resources of the uplands and the inner continental shelf, the Secretary over the outer continental shelf.

Much cooperation will be necessary. The states are experienced in the field of conservation. They have brought about practices during the past 25 years which have resulted in more oil and gas being conserved than was used in fighting two great World Wars. They have demonstrated their ability to conserve while making oil and gas plentiful.

Cooperation between the state agencies and the Secretary will not be new. The states have for years exercised this conservation jurisdiction over the federal public lands. They have promulgated the same set of rules for lands privately owned, for state lands, and for federal lands. Moreover, Congress, to assist in enforcing these state rules, enacted the Connally Hot Oil Act, making it a federal offense to transport in interstate commerce oil produced in violation of state laws.

Many oil and gas fields will be bisected by the line dividing lands of the inner continental shelf from lands of the outer continental shelf. On the uplands where state lines have pierced a field, the state agencies, through joint hearings and consultation, have promulgated a common set of rules. The same cooperation between the federal government and the states will result in better conservation practices.

Waste incident to the excessive storage of oil from the outer continental shelf must be avoided. Some states have eliminated this type of waste by confining production to the market demand. Outer continental shelf oil must find a place in the market, but when it is necessary to curtail production to prevent the wasteful storage of oil, the production from the outer shelf should be reduced proportionately. Joint action on the part of the state agency and the Secretary will be advisable in many instances.

The Secretary can promulgate other rules. He may publish rules for the assignment or relinquishment of leases, for the sale of royalty oil and gas, for unitization and pooling, for drilling agreements, for the suspension of operations or production, for the reduction of rentals or royalties, for compensatory royalty agreements, for the subsurface storage of oil or gas and for drilling easements and other easements necessary for operations or production.

Each new lease will be conditioned upon a compliance with the regulations in force on the date the lease is issued. Each lease issued by a state which is ratified by the Act will be conditioned upon compliance with the regulations issued within 90 days after the Secretary determines that the lease comes within the ratification provisions of the Act.

A nonproducing lease may be canceled by the Secretary for a breach of the provisions of the lease or of the regulations, if the default continues for a period of 30 days after notice of the breach. However, the Secretary's action may be reviewed by the courts. A producing lease can be canceled only by the courts.

This discussion has not included any of the engineering problems incident to producing oil or gas in the open sea. There are many. Some have been solved, others remain to be solved.

It should be clear that finding and producing oil from the continental shelf is not the bonanza some have represented it to be. The costs will be great, the hazards even greater. Expensive shore bases, boats for geophysical operations, expensive drilling platforms, costly transportation of men and material, expensive communication facilities, high insurance premiums, more men, more material, standby boats, more travel time, dangerous hurricanes, high waves, costly pipe lines or barges, more regulations, uncertainties as to boundaries, are only some of the perplexing problems in producing oil from the open sea. But they will not discourage the oil industry, which is willing to spend its dollars today for the oil the nation will need 10 years hence.

However, the right governmental atmosphere will be necessary. The government must regulate, but only to the extent necessary to protect the public interest. It should not usurp the prerogatives of management.

The Submerged Lands Act and the Outer Continental Shelf Lands Act should be interpreted and administered reasonably. They were highly controversial. Many provisions resulted from compromises made so that the oil can be developed today and made available to the nation tomorrow.

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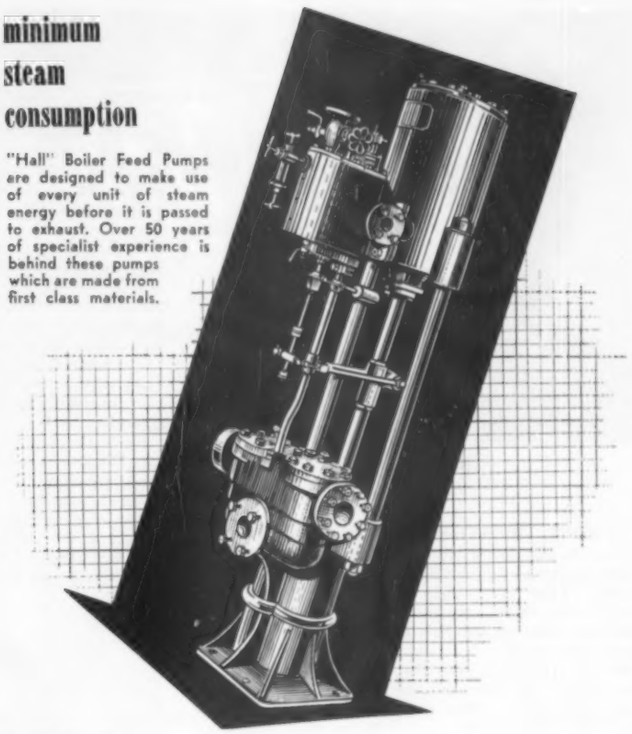

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A. Weatherholt

AUBREY WEATHERHOLT has been appointed to the newly created position of assistant chief engineer of Cities Service Oil Co. and Cities Service Pipe Line Co., with headquarters in Bartlesville, Okla. He has been Kansas district superintendent at Oil Hill for the pipe line company since 1949.

Mr. Weatherholt has been with Cities Service since 1937. He was with the engineering department until 1940, when he transferred into the pipe line division. He joined the purchasing department and was sent to Chicago in 1947 as field purchasing agent during the modernization program of the East Chicago refinery, returning to Oil Hill in 1949 as pipe line superintendent.

W. G. COPELAND has been appointed general superintendent of the Port Arthur, Texas works of The Texas Company. The promotion was followed by a number of other Texaco promotions.

Mr. Copeland joined Texaco in 1926 as a laboratory helper at Port Arthur. He transferred to New York in 1934, to a Texaco affiliate in France in 1939, to Texaco's San Antonio refinery in 1941 as assistant superintendent, and was appointed superintendent of the Sunburst, Montana refinery in 1943. In 1950 he was named superintendent of the company's Eagle Point works in Westville, N. J.

E. W. McNealy, who has been assistant superintendent at Lockport, Ill., has been promoted to superintendent of Eagle Point works, succeeding Mr. Copeland. Mr. McNealy has been with the company for more than 21 years.

J. C. Williams, formerly assistant superintendent of West Tulsa works, has been named assistant superintendent at Lockport. F. D. Davis, who was assistant superintendent at Casper, Wyoming, succeeds Mr. Williams at Tulsa and V. K. Brandenburg, formerly supervisor of operations at Lawrenceville, has been promoted to assistant superintendent at Casper.

JAMES A. CHRISTENSEN has joined the staff of Standard-Vacuum Oil Co. as assistant manager of its economic coordination department at New York, following 25 years of service with Esso Standard Oil Co. Mr. Christensen has been head of the economic and long-range planning section of Esso Standard's technical service division at Linden, N. J. for the past six years. His oil industry career began in 1928 as an Esso laboratory employee. He joined the technical service division in 1938, becoming an assistant head in 1946.

HENRY WASZKOWSKI JR. has been appointed assistant to the coordinator of domestic production for Socony-Vacuum Oil Company, Inc., according to F. H. Wilcox, manager of the company's producing department. Mr. Waszkowski will report to E. C. Cram. For 14 years Mr. Waszkowski has been with Magnolia Petroleum Co., most recently as assistant superintendent of the producing district headquarters at Falfurrias, Texas.

COL. E. J. VELLA, who described himself as "boss of 30 employees, six trucks and one horse," has retired as general manager of Esso Standard (Malta) Ltd. after 45 years of service. The veteran oil man, commissioned and decorated by Britain for his fighting defense against the saturation bombings of Malta during World War II, left his post on his 65th birthday. His career, climaxed by 15 years as head of the company, an affiliate of Standard Oil Company (New Jersey), extends back to 1908 when he started as a secretary.

Because of its strategic position in Britain's Mediterranean defenses, the island fortress of Malta suffered almost three years of blockade and air attacks. Early in these assaults Esso Malta's storage facilities were completely destroyed. Colonel Vella and his staff, working around the clock, had transferred gasoline and other vital petroleum products into barrels and dispersed them into tunnels and caves before the plant's destruction.

Since the war, Colonel Vella and his staff have been busy constructing new bulk storage plants for the company, which competes with two other firms in serving the 235,000 residents of Malta. Their chief products are kerosine and gasoline for the 9,000 motor vehicles on the island. Gasoline, like kerosine, is marketed through independent distributors and service stations.

C. A. Jackson

C. A. JACKSON, assistant to the president of Ohio Oil Co., has been elected treasurer of the company, succeeding J. R. Donnell. G. H. Young, who has been assistant sales manager, will become presidential assistant succeeding Mr. Jackson.

ELIZABETH VAN KUYK of the Socony-Vacuum Oil Co. has been elected 1954 president of the Desk and Derrick Club of the City of New York. A charter member of the club, Miss Van Kuyk holds one of the most unusual jobs, for a woman, in the oil industry—that of assistant manager of the pipe line right-of-way division of Socony.

Other new officers are Constance Keller, Esso Standard Oil Co., vice president; Ruth Leonard, The Texas Company, recording secretary; Dorothy Watson, Ethyl Corp., corresponding secretary; Muriel Havens, Tide Water Associated Oil Co., assistant correspondent secretary; Mary Conroy, Chase National Bank, treasurer; and Ann Highnett, E. I. duPont de Nemours & Company, assistant treasurer.

OLIVER S. AMBROSE has been placed in charge of Tide Water Associated Oil Company's economics and petroleum analysis department, headquartered in San Francisco. He has been transferred from New York and will report directly to President David T. Staples. Starting with Tide Water Associated as a construction engineer at its Drumright, Okla., refinery in 1920, Mr. Ambrose later served there in the operating department. In 1928 he was made a petroleum analyst in the New York office.

J. F. ADAMS, vice president of the Gulf Oil Corp. and the Gulf Refining Co. and in charge of the corporation's Fort Worth production division, retired December 31, 1953. Mr. Adams is a veteran of over 43 years of service with Gulf, having started as a clerk in the Beaumont, Texas, production office on his 18th birthday, July 26, 1910.

In 1912 Mr. Adams was transferred to the Gulf production district office at Shreveport, La. He worked there until 1917, when he enlisted in the U. S. Army. After the war he was made assistant to the vice president at Fort Worth. In 1950 he was elected a vice president, and placed in charge of operations there.

Upon Mr. Adams' retirement, H. M. Bayer, who is currently manager of exploration, will be in charge of the company's production operations in Fort Worth. Mr. Bayer himself is a veteran of nearly 30 years' service with the production division of the Gulf companies.

J. E. HESTON has been elected vice president and director of Cities Service Oil Co. (Del.). He has been coordinator of oil production for Cities Service in New York and will transfer to Bartlesville, Okla. headquarters of the company. A native of Oklahoma, Mr. Heston joined Cities Service in 1930 as a geological scout. In 1941 he served as assistant director of production in the Petroleum Administration for War in Washington. He is a director of Canada-Cities Service Petroleum Corp.

WALLACE EASTMAN COOK, assistant communications supervisor of Creole Petroleum Corp., has been transferred to La Salina, Venezuela. He has been with Creole since 1951.

ROBERT SIEGEL has been elected a director and executive in charge of Middle East affairs of Socony-Vacuum Oil Company, Inc. He fills a vacancy on the board of directors left by the death of Charles L. Harding.

Mr. Siegel joined Socony as an office boy in 1920. In subsequent years he attended night classes at New York University under the company's education plan and received his bachelor of science degree in 1932. His entire college course was taken in night classes while he worked full-time during the day. In 1926 he was made assistant to the director in charge of production. In 1933 he became secretary to the executive committee. Four years later he was appointed assistant manager of the foreign producing department and remained in that position until 1946.

He moved to Caracas, Venezuela, in 1946 as president of Socony-Vacuum Oil Co. of Venezuela. After three years there he returned to New York in 1949, and on August 1 of that year was appointed manager of the foreign producing department. He served in that capacity until November 1, 1951, when he became president of Socony-Vacuum Overseas Supply Co. with headquarters at Fort Lee, N. J. He has been succeeded in that position by A. C. Ingraham.

R. Siegel

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O. I. TORKELSEN, formerly exploration and production coordinator of The British American Oil Company, has been appointed to the newly-created post of vice-president in charge of exploration and production for Western Canada. In addition, Mr. Torkelsen will be responsible for crude oil purchasing and crude oil transportation in Canada. His headquarters will be in Calgary.

Mr. Torkelsen joined British American 14 years ago as a field geologist, becoming a vice-president of the British-American Oil Producing Co. He came to Toronto in March 1951 to be the company's exploration and production coordinator. He retains his post as director of the producing company and of the Toronto Pipe Line Co.

DR. JAMES S. CROSS, former assistant professor of marketing at the Massachusetts Institute of Technology, has been appointed manager of the statistical reesarch division of Sun Oil Co. Dr. Cross has conducted a number of studies in the field of petroleum economics. His paper, "Vertical Integration in the Petroleum Industry," appeared in a recent issue of *Harvard Business Review.*

B. L. RODZIANKO has been named assistant manager of General Petroleum Corporation's Ferndale (Wash.) refinery. In 1938 he joined Socony-Vacuum Oil Company, Inc., at Paulsboro, N. J., where he was engaged in the development of the Thermofor catalytic cracking process. In 1944 he transferred to General Petroleum and has held numerous jobs at its Torrance (Calif.) refinery, the most recent being senior refinery engineer.

R. J. OSTRANDER, former supervisor of motor vehicle operations at Ethyl Corporation's research and engineering laboratories at Detroit, has been promoted to assistant director of technical service. He joined Ethyl in 1941.

O. I. Torkelsen

PHILIP FELL of Union Oil Co. has been appointed manager of export sales. He will be responsible for all sales originating in the eastern hemisphere and all shipments into that area.

W. G. HELMSING, of Vernon, B. C., has joined Royalite Oil Company Ltd. as sales representative with headquarters at Kamloops, B. C. Mr. Helmsing was formerly with the Standard Oil Company of British Columbia for 18 years.

GLEN R. HARSH has been appointed manager of the oil production department of Cities Service Petroleum, Inc., to succeed J. E. Heston, recently elected vice president and director of Cities Service Oil Co. (Del.), with headquarters in Bartlesville.

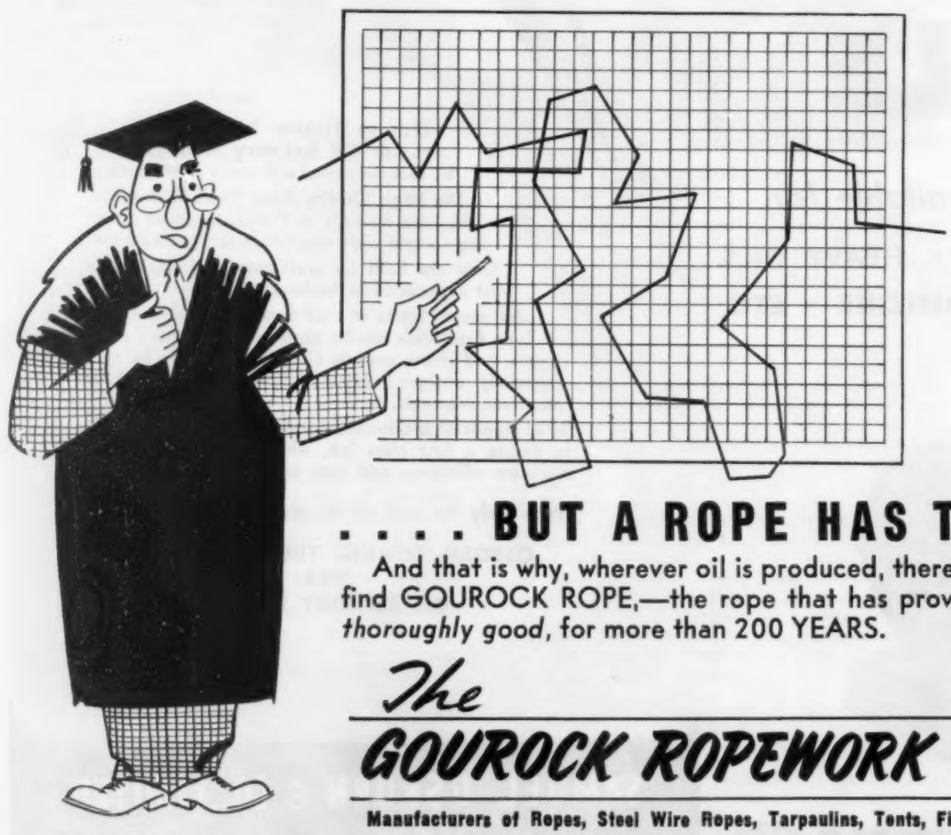
Mr. Harsh joined Cities Service in 1924. He was appointed superintendent for South Oklahoma and North Texas in 1948 and three years later was named assistant general superintendent of the oil production division of Cities Service Oil Co. (Del.), with headquarters in Bartlesville.

J. P. STRAIGHT has been appointed assistant general superintendent of oil production for Cities Service Oil Co., with headquarters in Bartlesville, Okla. He has been Gulf Coast division superintendent in Houston. He succeeds Glen R. Harsh, recently named manager of the oil production department of Cities Service Petroleum, Inc., New York.

F. D. Priebe, district superintendent at Odessa, Texas succeeds Mr. Straight at Houston, and Don Kastner, district engineer at Odessa, becomes superintendent there.

W. J. WILSON has been appointed assistant manager of the secretary's department of Ohio Oil Co. which is headed by H. H. West, secretary of the company. Mr. Wilson formerly was manager of the personnel department. G. K. Barrett advanced from assistant manager to manager of the personnel department, and J. R. Hause became assistant manager.

C. LANE SARTOR of Shreveport has been named manager of the land department of Pan-Am Southern Corp. to succeed G. P. Brown, resigned. Mr. Sartor joined Pan-Am Southern in March 1950 after prior service with Barnsdall Oil Co. as a geologist. He has been serving as district geologist for Pan-Am in northern Louisiana.



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INTERNATIONAL NEWS AND NOTES

UN Assists Turkey in Oil Search

At the request of the Government of Turkey, the United Nations Technical Assistance Administration is sending George R. Elliott of Bartlesville, Okla. to assist the government in its search for possible new oil fields, particularly in southeastern Turkey across the borders of Iraq and Syria.

Oil prospecting in Turkey has been going on for many years under the direction of the government's Mineral Research and Investigation Institute, which has, since 1935, carried on all petroleum exploration activities in the country. As a result of the Institute's activities, oil fields were discovered in two areas, Raman and Garzan, in southeastern Turkey. Mr. Elliott will assist in this exploratory work and help in evaluating the potentialities of existing oil fields and suggest possible ways of developing them to their full capacity.

New Jetty at Venice Refinery

A new ocean tanker jetty, designed to take tankers of up to 16,000 tons, has been commissioned at Porto Marghera refinery, Venice, which is jointly owned by Anglo-Iranian Oil Co. and Azienda Generale Italiana Petrole. The new jetty stands on the Brentalla Canal.

Alterations are being made in the oil dock which will enable larger tankers to berth at the jetties, which have not been able to accommodate tankers over 12,000 tons. The width between the jetties is being increased from about 75 feet to approximately 100 feet, which has necessitated the demolition of part of one of the jetties, rebuilding it and dredging an area of the canal. These alterations when completed will enable two tankers of 16,000 tons to be berthed side by side.

Soviet Reports Faster Drilling Method

A new method of flushing oil wells with water instead of mud solutions has been adopted in the so-called Second Baku fields in the Volga-Ural area, according to Tass news agency. The length of service of the bit has increased considerably and drilling is faster. Up to recently, the speed of drilling did not exceed 1,000 meters per month. Not long ago it became known that the drilling brigade of Gasin Reifullin, using the new method of drilling, increased its speed to 2,061 meters per month, while the brigade led by Richard Allayarov increased its speed to 2,385.6 meters per month.

Petroleum Guide to France

A new edition of the *Guide du Petrole* (Petroleum Guide) for 1953-54 has just made its appearance. The work, now in its twentieth year of annual publication, is a very encyclopedia of information covering every feature of the French petroleum industry. Its 1,216 pages contain the complete text of laws and regulations affecting petroleum, rosters of trade organizations for research, production, refining and distribution, lists of officers and technicians of oil companies and personnel of engineering firms and manufacturers of petroleum equipment. It is designed to answer almost any question that can be asked regarding the petroleum industry and its operation in France. The work is published by Olivier Lesourd in Paris and sells for 5,500 francs.

Hungarian Petrochemical Plant

A new petrochemical plant was begun last month near Tisazalo, with 1955 scheduled as the completion date. Methane for use as raw material will be piped from Romania.

Petrofina Expands in Canada

To expand its operations in Canada, the Petrofina group, which has its headquarters in Brussels, has organized Canadian Petrofina Ltd. in the Dominion with a projected issue of $25 million capital out of an authorized total of $45 million. The new company replaces the Canadian Fina Oil Co. Ltd. through which Petrofina has conducted its Canadian operations for the past several years. The enlarged capitalization is reportedly to provide for the erection of a refinery in one of the eastern provinces. A. F. Campo, formerly general sales manager of McColl Frontenac Oil Co. Ltd., has been appointed executive vice president of Canadian Petrofina.

Brazilian Production Gaining

Revised statistics of the National Petroleum Council of Brazil place the 1952 production of crude oil from the Bahia fields at 752,249 barrels or approximately 2,000 barrels daily. For 1953 a substantial gain is indicated by the results of the first three quarterly periods, during which the average output has been 2,700 barrels daily or at the rate of nearly a million barrels for the full year.

New B-A Building for Vancouver

The British American Oil Co. Ltd. is building a new office building in Vancouver to house the Pacific Coast regional offices and the British Columbia sales office. It will be completed by April 1, 1954.

Book Review

Technical Dictionary of the Petroleum Industry; English-Spanish and Spanish-English. Published by Instituto Sud Americano del Petroleo (Seccion Argentina), Buenos Aires; 619 pages; $150 (Argentine currency). (Approximately $4.13 U. S.)

This dictionary comprises the majority of words used in the technical literature of the oil industry in the United States and Great Britain, and may be regarded as the most complete and up to date of its kind.

Brazil to Build Oil Shale Plant

In pursuance of the policy set forth in its recently enacted petroleum law of developing hydrocarbon resources under state direction, including both liquid and shale deposits, the National Petroleum Council of Brazil has entered into a contract with Foster-Wheeler Corp. for construction of a distillation plant to operate on oil bearing shale. The plant is to be located at Trememba in the state of Sao Paulo. It is to have a daily capacity of 10,000 barrels to be derived from the shale deposits of the Trememba district.

To Build Cat Cracker in Canada

Royalite Oil Co. will erect a catalytic cracking and polymerization unit at its new 5,000-barrel refinery now under construction at Kamloops, B. C. Licenses covering the installation have been obtained from Universal Oil Products Co.

Installation of the Kamloops crude unit now is well under way and is expected to be completed by February 1954. The $2 million cracking unit will be completed in 1955.

Germany's Record Production

For the first time in history, production of crude oil in West Germany exceeded two million tons in 1953. The two million mark was passed early in December, and when results for the year are compiled, they are expected to show a daily average of more than 40,000 barrels for the year.

Louis Webber Visits South America

Louis Webber, general manager of Martin-Decker Corp., has completed a seven-week field survey, sales and service trip to Trinidad, Colombia, and Peru. He introduced new product developments to these countries and appointed Donald E. Merritt, Precision Tecnologica C.A. of Maracaibo, Venezuela, distributor for Martin-Decker equipment.

New Canadian Terminal

Canadian Oil Companies is building a $200,000 marine terminal at Cobourg, Ont., the seventh in a chain of Great Lakes and St. Lawrence river shipping terminals. Others are in operation at Toronto, Hamilton, Montreal, Quebec, Fort William and Parry Sound. The latter terminal was completed two years ago. One feature of the new terminal will be installation of a vapordome in the key tank in the gasoline storage group. It will be linked to the other tanks.

Oil well in Shensi Province in Northwest China where Communists report extensive exploration and drilling activity under guidance of Russian technicians. Eastfoto.

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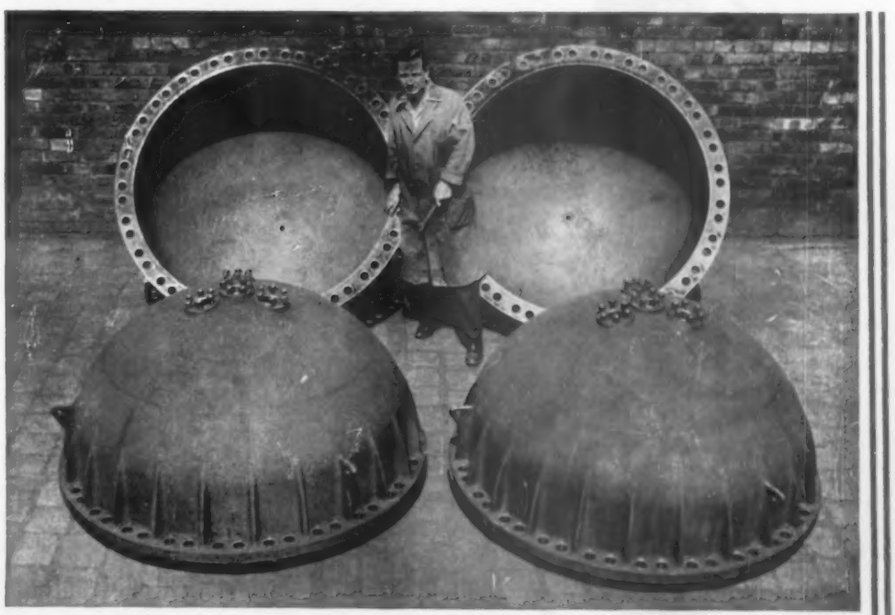

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Lummus Appoints Sterling

The Lummus Co. has appointed the Sterling Advertising Agency, Inc., 535 Fifth Avenue, New York 17, N. Y., to handle its advertising and public relations effective January 1, 1954, according to Robert Hennes, Lummus advertising manager. Paul B. Slawter, Jr., is the account executive. Lummus designs, engineers and constructs petroleum refineries and plants for making chemicals and petrochemicals. It has built over 700 of these units throughout the world.

New Gasoline Dye

A new gasoline-soluble dye, du Pont Oil Bronze, has been announced by du Pont's petroleum chemicals division. It will produce a red-orange or bronze shade, and its use will simplify operations for refiners who have previously obtained this shade by the addition of several dyes.

Plastic Pipe

Republic Steel has published a new catalog entitled "Republic Plastic Pipe." It describes the two principal types of plastic pipe made and gives joining, engineering and corrosion data. Copies are available from the advertising division, Republic Steel Corp., 3100 E. 45th Street, Cleveland 27, Ohio. Ask for Adv. 603.

Heads U.S. Rubber Sales Promotion

Thomas R. Worthen has been appointed manager of advertising and sales promotion for the international division of United States Rubber Co., according to an announcement by G. J. Russ, general sales manager for the division. Mr. Worthen, who formerly served as assistant to the advertising and sales promotion manager, joined U. S. Rubber in 1941.

J. P. O'Donnell

Appointed Deputy Director of OIIC

John P. O'Donnell has been appointed deputy director for field activities of the Oil Industry Information Committee of the API and Donald R. Waugh has been assigned to the post of sales manager. Mr. Waugh has been national field supervisor for the past two years, and will handle the sales and distribution of all Information Committee materials. Mr. O'Donnell was New York District Editor for the *Oil and Gas Journal* from 1940 to 1944, and for 10 years prior to that he was in the circulation, advertising and editorial departments of the Oil City, Pa., *Derrick*.

Plan "Package" TCC Unit

Bay Refining Corp., Saginaw, Mich., will erect a "package" TCC cracking unit at its Bay City plant. The 6,000 b/d unit will be supplemented with a 300 b/d polymerization unit. Bay will have a crude capacity of 10,000 b/d when the modernization work is completed late in 1954. Southwestern Engineering Co., Los Angeles, has been awarded a contract for the $3 million construction job.

New Transistor

Development of a new type of transistor which outperforms all transistors currently in use for both military and civilian equipment, has been announced by Philco Corporation. The new "Surface-Barrier" transistor operates at high frequencies and with low power consumption—requirements which have limited the use of transistors up to this time.

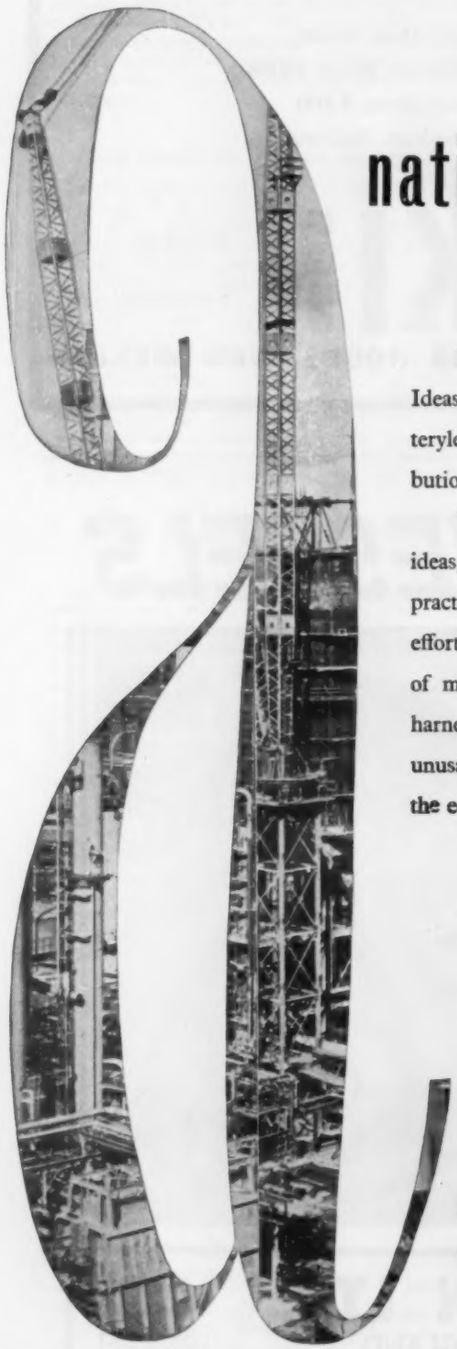
A portable military communications receiver operating on very high frequency channels can be powered solely by two flashlight cells. The receiver can be made as small as a pack of cigarettes and has an operating life of many weeks.

Behind the "Surface-Barrier" transistor is a new method of processing germanium which gives promise of transistor mass production.

Introduces RPM in East

The California Oil Co. has introduced RPM 10W-30 motor oil in the east. Distributors in various marketing areas were briefed on qualities of the new oil at a series of meetings beginning at Philadelphia on December 7. To dramatize the lubricant a test engine and various laboratory equipment was flown in from California for the meetings. The equipment was designed to show that the use of a wide viscosity range oil reduces engine drag and thus increases starting ability and gasoline mileage. Improved valve lifter lubrication is claimed, particularly in the start-up period.

The RPM year-around oil was developed by Standard Oil Co. of California and introduced on the West Coast some months ago. It is colored red for identification and contains eight components to provide special qualities.



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Magcobar Appointments

Appointment of a number of new district managers has been announced by Magnet Cove Barium Corp.

Roy C. Stringfellow is new manager of the Shreveport district. He was formerly a field service engineer for Magcobar in the Shreveport area.

New manager of the Regina, Saskatchewan district is Harold A. Fogarty. Mr. Fogarty was a field service engineer in Regina before his present appointment.

James E. Carlton will manage the Laurel, Miss. district. He was previously a field service engineer at Goliard, Texas.

Thomas L. Cox has been named to manage the northern Oklahoma district with headquarters at Enid. He formerly was a field service engineer in Enid.

The southern Oklahoma district will be managed by Cleron L. Henderson. His headquarters will be in Ardmore where he was formerly a field engineer.

John H. Moran, who has been a salesman in the Texas Gulf Coast Division since 1949, has been named special sales representative. Robert B. Hyde, Jr., will serve as a technical and industrial engineering consultant. He was formerly district manager in Oklahoma City. Wallace W. Frazer has been appointed an engineering consultant in Magcobar's Denver office.

Du Pont TEL Capacity Rises

The completion of a 14 percent increase in tetraethyl lead productive capacity was announced recently by the du Pont Company. This marks a total increase in du Pont's TEL plant capacity in excess of 100 percent during the last three years. The company also stated that a further substantial increase in TEL productive capacity is under way.

New Division Office

Shell Pipe Line Corp. has opened a new division office at Denver, Colo., to operate the company's gathering systems in the Denver-Julesburg Basin and handle future pipe line developments by the company in the Rocky Mountain area and the Williston Basin. Division superintendent is Roy Belshe, transferred from Wichita, Kansas.

McCullough Appoints Eastern Sales Manager

J. A. Williams has been appointed assistant eastern division sales manager of McCullough Tool Company. Mr. Williams joined McCullough Tool Co. in 1950, working in the field as an operator and later on in the shop as a part of the regular McCullough trainee program for sales engineers. He will work out of the McCullough eastern division headquarters at Houston, Texas.

J. A. Williams

Pennzoil to Build Lube Unit

The Pennzoil Company has awarded the contract for a new crude distillation unit to The M. W. Kellogg Co. A combination 12,000 b/d atmospheric and vacuum distillation unit will be installed in Pennzoil's Rouseville, (Pa.), refinery and will replace three smaller distillation units.

Cooper-Bessemer Appoints Williamson

R. G. Williamson has been appointed as branch manager of Cooper-Bessemer's district office in Los Angeles. A captain in the U. S. Army Air Force during World War II, he was commanding officer of the 987th Engineering Squadron.

Mr. Williamson has undergone extensive factory training in both engineering and operation of gas engines, diesel engines and compressors at Cooper-Bessemer's plants in Mount Vernon, Ohio, and Grove City, Pa.

New Cracker on Stream

Ben Franklin Refining Co., Ardmore, Okla., put on stream recently a new 5,000 b/d UOP high conversion fluid catalytic cracking unit. A gas concentration, polymerization, and LPG unit also were placed in operation. A thermal cracking unit was revamped into a single coil cracking unit to handle the catalytic cycle stock. Still under construction is a vacuum distillation unit which will be used to prepare salable asphaltic materials and feed stock for the catalytic cracker.

J & L to Sell IDECO Products

Jones & Laughlin Steel Corp., supply division, has been appointed distributors of IDECO products in Canada and continental United States excepting California, Washington and Oregon. There are 114 Jones & Laughlin stores and sales offices involved.

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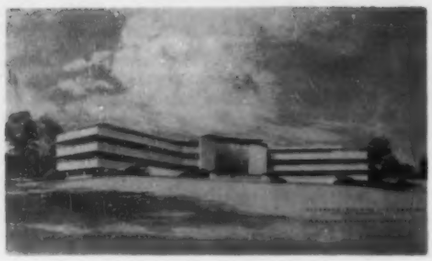

Set back more than 300 feet from Westchester Avenue in Harrison, New York, atop a gentle slope rising 90 feet above the street level, Standard-Vacuum Oil Company's new international headquarters building will have low sweeping lines which blend with the surrounding area. The architectural rendering above by Eggers & Higgins shows how the $5 million structure, providing office facilities for 700 persons, will appear when completed in 1955. Ground-breaking at the 55-acre site is tentatively scheduled for March.

Enlarges Research Labs

Jefferson Chemical Co., Inc. has announced the completion of a major addition to its research laboratories at Austin, Texas. The new facilities, comprising two air-conditioned, interconnected brick and concrete buildings, provide upwards of 25,000 square feet of additional floor space. The smaller of the two buildings houses the library and administrative offices, and the other contains fully-equipped laboratories to accommodate about 50 research chemists and assisting technicians.

Evaporation Loss Committee

A new committee to study losses of petroleum liquids by evaporation has been appointed by President Frank M. Porter of the American Petroleum Institute. J. H. McClintock, of Esso Standard Oil Co., New York, was named chairman. The group is to be known formally as the Committee on Evaporation Loss. The specific scope of its activities will be "the development of factors governing the evaporation loss of petroleum liquids for use in the solution of operating problems."

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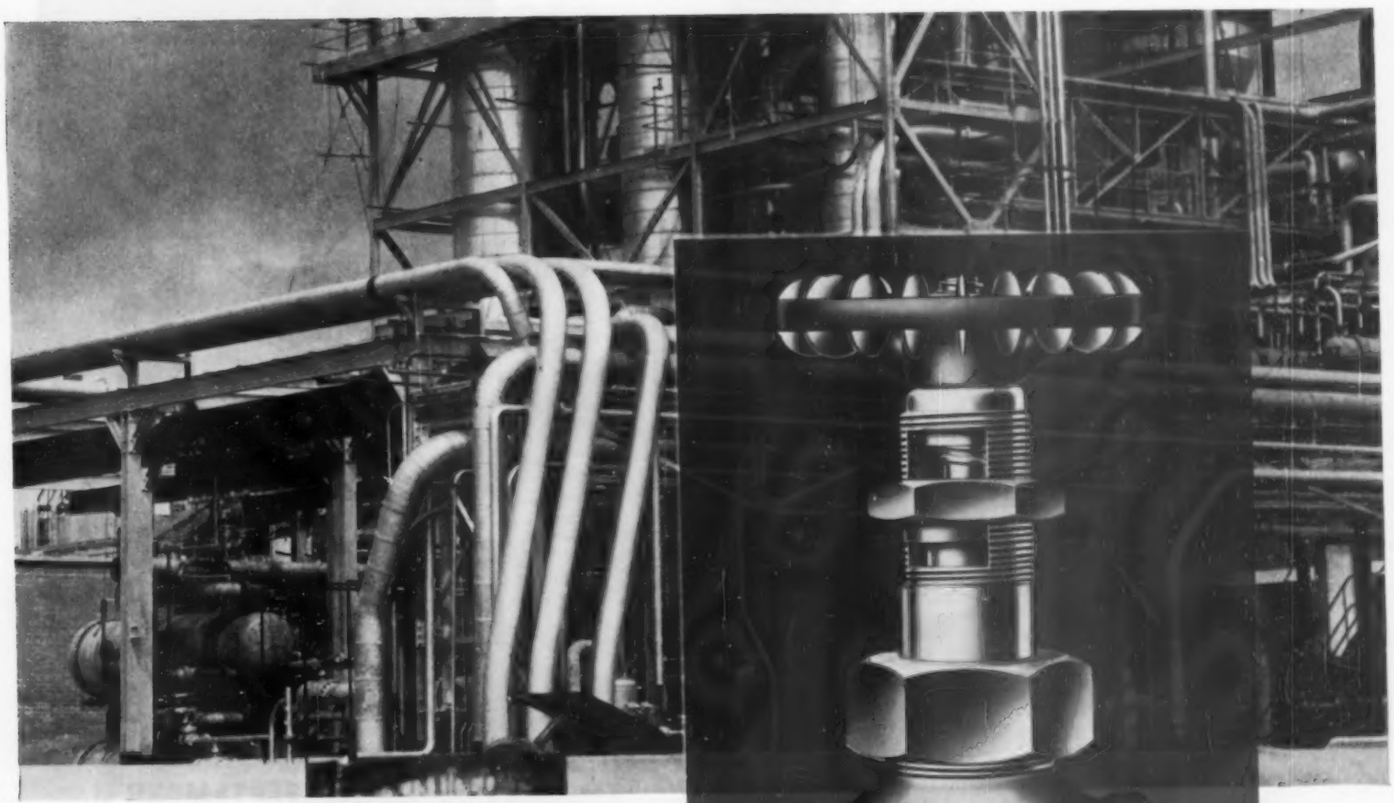

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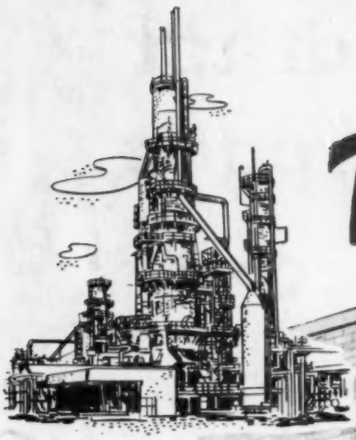

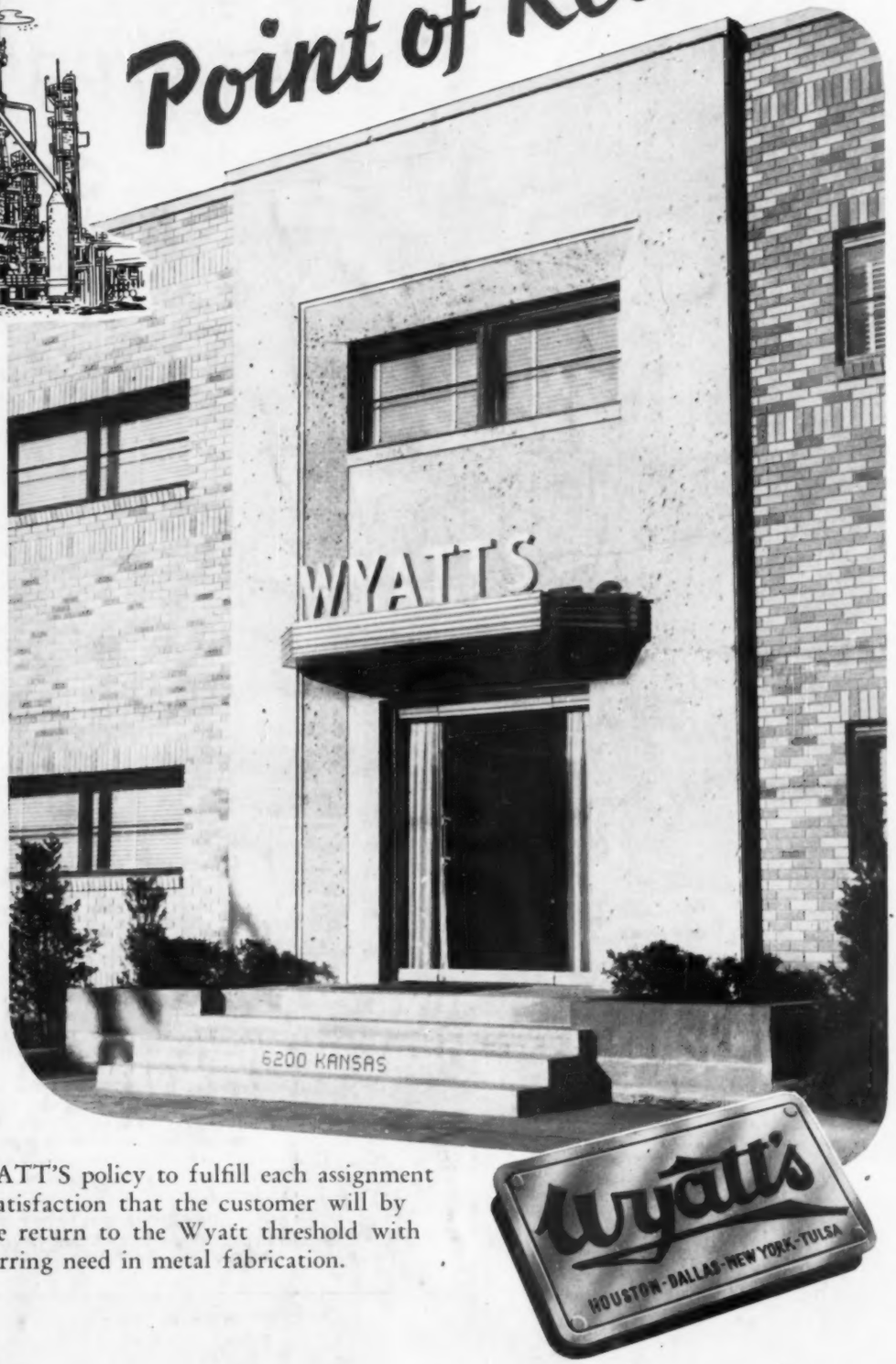

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